On the possible mathematical connections between some topics of Ramanujan's mathematics and various equations regarding Extremal Black Hole Entropy, Toroidal Compactification, Supersymmetry Breaking, Planck CMB data and Frequency System based on Phi

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Abstract

In this research thesis, we analyze new possible mathematical connections between some topics of Ramanujan's mathematics and various equations regarding Extremal Black Hole Entropy, Toroidal Compactification, Supersymmetry Breaking, Planck CMB data and Frequency System based on Phi

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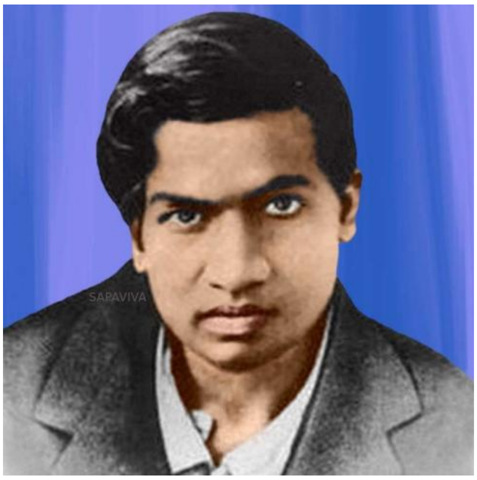


Srinivasa Ramanujan
(December 22, 1887 – April 26, 1920)

Joel Scherk
(1946-1980)

We want to highlight that the development of the various equations was carried out according an our possible logical and original interpretation

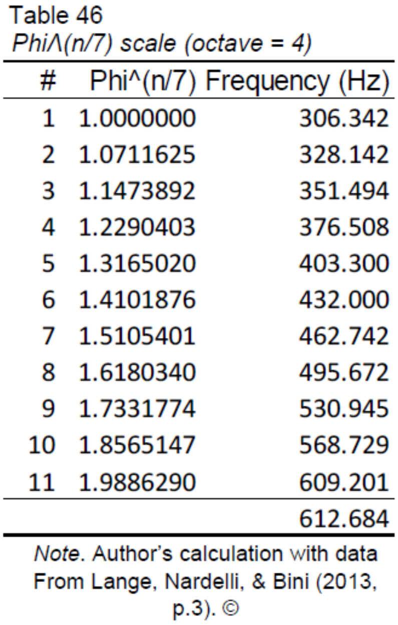


Table 46

Phi^(n/7) scale (octave = 4)

#	Phi^(n/7)	Frequency (Hz)
1	1.0000000	306.342
2	1.0711625	328.142
3	1.1473892	351.494
4	1.2290403	376.508
5	1.3165020	403.300
6	1.4101876	432.000
7	1.5105401	462.742
8	1.6180340	495.672
9	1.7331774	530.945
10	1.8565147	568.729
11	1.9886290	609.201
		612.684

Note. Author's calculation with data From Lange, Nardelli, & Bini (2013, p.3). ©

Table of Frequency System based on Phi

Planck multipole spectrum data

103,1
103,98
124,55
127,88
162,27
179,33
191,16
208,67
213,07
215,63
218,14
226,13
232,56 150802.7363

239,6
250,1
278,34
299,495
319,73
342,35
365,19
373,95
374,45
382,85
387,21
420,02
477,66
554,48
581,438
599,185
620,243
631,571
639,652
645,569
645,593
658,099
658,83
689,45
691,994
704,645
722,68
729,551
732,75
736,931
743,136
746,75
749,62
763,366
768,34
786,337
793,96
797,376
806,23
841,08
889,209
903,34
907,4
917,942

931,293
931,908
973,755
975,998
985,83
1003,34
1006,77
1017,97
1033,69
1034,38
1042,69
1042,9
1065,2
1076,17
1081,01
1113,53
1113,58
1118,05
1140,7
1162,04
1163,21
1170,97
1185,37
1204,04
1254,91
1283,88
1284,54
1298
1298,08
1354,41
1375,35
1402,5
1407,61
1425,6
1580,53
1619,33
1682,61
1691,91
1792,35
1819,88
1836,2
1863,84
1922,19
1927,53

1962,25
2016,71
2030,01
2124,69
2229,41
2237,31
2282,71
2341,59
2345,97
2396,51
2464,71
2484,24
2506,61
3027,82
3123,86
3893,83
4116,06
4867,41
4953,54
5524,53
5703,16

From:

Alpha-prime corrections to space-like branes
Shibaji Roy and Harvendra Singh – arXiv:0707.1422v2 [hep-th] 23 Jul 2007

We have that.

$$(t_g)^2 = \frac{755}{3}\alpha' \qquad (47)$$

Note that:
755/3

Input:

$$\frac{755}{3}$$

Exact result:

$$\frac{755}{3} \text{ (irreducible)}$$

Decimal approximation:

251.6666666666666666666666666666666666666666666666666666666666666666666666

...

251.6666… result very near to the value of Planck multipole spectrum data 250.1

and

$$t_g^2 = \frac{121(\sqrt{3}+2)}{4\sqrt{3}}\alpha' \qquad (50)$$

(121(sqrt3+2))/(4sqrt3)

Input:

$$\frac{121\left(\sqrt{3}+2\right)}{4\sqrt{3}}$$

Decimal approximation:

65.179691285972358752803501220368426066679905951842675999125440752

...

65.17969128…

Alternate forms:

$$\frac{121}{12}\left(3+2\sqrt{3}\right)$$

$$\frac{1}{12}\left(363+242\sqrt{3}\right)$$

$$\frac{121\sqrt{3}}{6}+\frac{121}{4}$$

Minimal polynomial:

$$48x^2-2904x-14641$$

Expanded form:

$$\frac{121}{4}+\frac{121}{2\sqrt{3}}$$

Dividing the two expression, we obtain:

755/(3(((121(sqrt3+2))1/(4sqrt3))))

Input:

$$\frac{755}{3\left((121(\sqrt{3}+2))\times\frac{1}{4\sqrt{3}}\right)}$$

Result:

$$\frac{3020}{121\sqrt{3}\,(2+\sqrt{3})}$$

Decimal approximation:

3.8611208752507406416137077209241572901778064270377382739864301815
…

3.86112087525…

Alternate forms:

$$\frac{3020}{363}(2\sqrt{3}-3)$$

$$\frac{1}{363}(6040\sqrt{3}-9060)$$

$$\frac{6040\sqrt{3}}{363}-\frac{3020}{121}$$

Minimal polynomial:

$$43923\,x^2+2192520\,x-9120400$$

From:

hep-th/9606169 - February 1, 2008
Chiral Asymmetry in Four-Dimensional Open-String Vacua - *C. Angelantonj, M. Bianchi, G. Pradisi, A. Sagnotti and Ya.S. Stanev*

We have that:

$$q \;=\; \exp(-2\pi\tau_2),$$

$$V_8-S_8=A_0\chi_0+A_+\chi_-+A_-\chi_+ \quad . \tag{2.5}$$

A_0, A_+ and A_- may be expressed in terms of the four level-one $SO(2)$ characters and of the 12 characters ξ_m $(m=-5,\ldots,6)$ of the $N=2$ superconformal model with $c=1$ (equivalent to the rational torus at radius $R=\sqrt{12}$), of conformal weight $h_m=\frac{m^2}{24}$, as

The twisted sector of the world-sheet orbifold, to be identified with the open-string spectrum, starts with the annulus amplitude

$$\begin{aligned} A \;=\; & \frac{(\mathcal{N}+\mathcal{M}+\bar{\mathcal{M}})^2}{6}\,\Xi_{0,0}(\sqrt{q})\,\sum\, q^{\frac{\alpha'}{2}m_aG^{ab}m_b} \\ & +\frac{(\mathcal{N}+\omega\mathcal{M}+\bar{\omega}\bar{\mathcal{M}})^2}{6}\,\Xi_{0,+}(\sqrt{q})+\frac{(\mathcal{N}+\bar{\omega}\mathcal{M}+\omega\bar{\mathcal{M}})^2}{6}\,\Xi_{0,-}(\sqrt{q}) \quad , \end{aligned} \tag{2.10}$$

m = 6

$$\omega = e^{\frac{2i\pi}{3}},$$

$$\begin{aligned} \mathcal{N} + \mathcal{M} + \bar{\mathcal{M}} &= 32 \\ \mathcal{N} - \frac{1}{2}(\mathcal{M} + \bar{\mathcal{M}}) &= -4 \quad , \end{aligned}$$

$$\begin{aligned} M = & -\frac{(\mathcal{N} + \mathcal{M} + \bar{\mathcal{M}})}{6}\ \hat{\Xi}_{0,0}(-\sqrt{q})\ \sum\ q^{\frac{\alpha'}{2} m_a G^{ab} m_b} \\ & - \frac{(\mathcal{N} + \bar{\omega}\mathcal{M} + \omega\bar{\mathcal{M}})}{6}\ \hat{\Xi}_{0,+}(-\sqrt{q}) - \frac{(\mathcal{N} + \omega\mathcal{M} + \bar{\omega}\bar{\mathcal{M}})}{6}\ \hat{\Xi}_{0,-}(-\sqrt{q}) \end{aligned}$$

-32/6*(-sqrt(e^-(2Pi)))*(e^-(2Pi))^((3.86112*36)/2)-1/6(8+8*(e^((2Pi*i)/3))+16*(e^((2Pi*i)/3)))*(-sqrt(e^-(2Pi)))-1/6(8+8*(e^((2Pi*i)/3))+16*(e^((2Pi*i)/3)))*(-sqrt(e^-(2Pi)))

Input interpretation:

$$-\frac{32}{6}\left(-\sqrt{e^{-(2\pi)}}\right)\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2} - \frac{1}{6}\left(8 + 8\,e^{1/3\,(2\pi i)} + 16\,e^{1/3\,(2\pi i)}\right)\left(-\sqrt{e^{-(2\pi)}}\right) - \frac{1}{6}\left(8 + 8\,e^{1/3\,(2\pi i)} + 16\,e^{1/3\,(2\pi i)}\right)\left(-\sqrt{e^{-(2\pi)}}\right)$$

i is the imaginary unit

Result:

$$-0.05761855768502966636589031622897068170097081308084411064095958\ldots + 0.29939480810792872380238740053582598242356071771589386538819223\ldots\, i$$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 0.304889$ (radius), $\theta = 100.893°$ (angle)

0.304889

Series representations:

$$\begin{aligned}&\frac{1}{6}\left(-\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)(-32) -\\&\quad\frac{1}{6}\left(8+8e^{(2\pi i)/3}+16e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}} -\\&\quad\frac{1}{6}\left(8+8e^{(2\pi i)/3}+16e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}} =\\&\quad\frac{8}{3}\left(1+3e^{(2i\pi)/3}+2\left(e^{-2\pi}\right)^{69.5002}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+e^{-2\pi}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\end{aligned}$$

$$\begin{aligned}&\frac{1}{6}\left(-\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)(-32) -\\&\quad\frac{1}{6}\left(8+8e^{(2\pi i)/3}+16e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}} -\\&\quad\frac{1}{6}\left(8+8e^{(2\pi i)/3}+16e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}} =\\&\quad\frac{8}{3}\left(1+3e^{(2i\pi)/3}+2\left(e^{-2\pi}\right)^{69.5002}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(e^{-2\pi}-z_0\right)^k z_0^{-k}}{k!}\end{aligned}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

$$\begin{aligned}&\frac{1}{6}\left(-\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)(-32) -\\&\quad\frac{1}{6}\left(8+8e^{(2\pi i)/3}+16e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}} -\\&\quad\frac{1}{6}\left(8+8e^{(2\pi i)/3}+16e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}} =\\&\quad-\frac{4\left(1+3e^{(2i\pi)/3}+2\left(e^{-2\pi}\right)^{69.5002}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\left(-1+e^{-2\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{3\sqrt{\pi}}\end{aligned}$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

1/[2(((-32/6*(-sqrt(e^-(2Pi)))*(e^-(2Pi))^((3.86112*36)/2)-1/6(8+8*(e^((2Pi*i)/3))+16*(e^((2Pi*i)/3)))*(-sqrt(e^-(2Pi)))-1/6(8+8*(e^((2Pi*i)/3))+16*(e^((2Pi*i)/3)))*(-sqrt(e^-(2Pi))))))]

Input interpretation:

$$1\Big/\left(2\left(-\frac{32}{6}\left(-\sqrt{e^{-(2\pi)}}\right)\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}-\frac{1}{6}\left(8+8\,e^{1/3(2\pi i)}+16\,e^{1/3(2\pi i)}\right)\left(-\sqrt{e^{-(2\pi)}}\right)-\frac{1}{6}\left(8+8\,e^{1/3(2\pi i)}+16\,e^{1/3(2\pi i)}\right)\left(-\sqrt{e^{-(2\pi)}}\right)\right)\right)$$

i is the imaginary unit

Result:

$-0.30991999061757949561244312099931090241427820860625283919792472\ldots$
$-$
$1.61039151009275231770429576156663112764537162459552249845603 50\ldots\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 1.63994$ (radius), $\theta = -100.893°$ (angle)

$1.63994 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Series representations:

$$1\Big/\left(2\left(\frac{1}{6}\left(-\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)(-32)-\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}}-\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}}\right)\right)=\frac{3}{16\left(1+3\,e^{(2i\pi)/3}+2\left(e^{-2\pi}\right)^{69.5002}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+e^{-2\pi}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

$$1\Bigg/\left(2\left(\frac{1}{6}\left(-\sqrt{e^{-(2\pi)}}\,\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)(-32)-\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}}-\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}}\right)\right)=$$

$$\frac{3}{16\left(1+3\,e^{(2i\pi)/3}+2\left(e^{-2\pi}\right)^{69.5002}\right)\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(e^{-2\pi}-z_0\right)^k z_0^{-k}}{k!}}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

$$1\Bigg/\left(2\left(\frac{1}{6}\left(-\sqrt{e^{-(2\pi)}}\,\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)(-32)-\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}}-\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)(-1)\sqrt{e^{-(2\pi)}}\right)\right)=$$

$$-\frac{3\sqrt{\pi}}{8\left(1+3\,e^{(2i\pi)/3}+2\left(e^{-2\pi}\right)^{69.5002}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\left(-1+e^{-2\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

From:

The twisted sector of the world-sheet orbifold, to be identified with the open-string spectrum, starts with the annulus amplitude

$$\begin{aligned} A \;=\; & \frac{(\mathcal{N}+\mathcal{M}+\bar{\mathcal{M}})^2}{6}\,\Xi_{0,0}(\sqrt{q})\,\sum\, q^{\frac{\alpha'}{2}m_a G^{ab} m_b} \\ & +\frac{(\mathcal{N}+\omega\mathcal{M}+\bar{\omega}\bar{\mathcal{M}})^2}{6}\,\Xi_{0,+}(\sqrt{q})+\frac{(\mathcal{N}+\bar{\omega}\mathcal{M}+\omega\bar{\mathcal{M}})^2}{6}\,\Xi_{0,-}(\sqrt{q}) \quad , \qquad (2.10) \end{aligned}$$

$$\begin{aligned} A \;=\; & \frac{(\mathcal{N}+\mathcal{M}+\bar{\mathcal{M}})^2}{6}\,\Xi_{0,0}(\sqrt{q})\,\sum\, q^{\frac{\alpha'}{2}m_a G^{ab} m_b} \\ & +\frac{(\mathcal{N}+\omega\mathcal{M}+\bar{\omega}\bar{\mathcal{M}})^2}{6}\,\Xi_{0,+}(\sqrt{q})+\frac{(\mathcal{N}+\bar{\omega}\mathcal{M}+\omega\bar{\mathcal{M}})^2}{6}\,\Xi_{0,-}(\sqrt{q}) \end{aligned}$$

(32^2)/6*(sqrt(e^-(2Pi)))*(e^-(2Pi))^((3.86112*36)/2)+1/6(((8+8*(e^((2Pi*i)/3))+16*(e^((2Pi*i)/3)))))^2*(sqrt(e^-(2Pi)))+1/6(8+8*(e^((2Pi*i)/3))+16*(e^((2Pi*i)/3)))^2*(sqrt(e^-(2Pi)))

Input interpretation:

$$\frac{32^2}{6}\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}+\frac{1}{6}\left(8+8\,e^{1/3\,(2\pi i)}+16\,e^{1/3\,(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{1/3\,(2\pi i)}+16\,e^{1/3\,(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}$$

i is the imaginary unit

Result:

$-5.992329992430853020525928878129508969009645604077875066597966\ldots - 2.395158464863429790419099204286607859388485741727150923105538 98\ldots\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 6.45328$ (radius), $\theta = -158.213°$ (angle)

6.45328

Series representations:

$$\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}=\frac{64}{3}\left(1+6\,e^{(2i\pi)/3}+9\,e^{(4i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+e^{-2\pi}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

$$\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}=\frac{64}{3}\left(1+6\,e^{(2i\pi)/3}+9\,e^{(4i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(e^{-2\pi}-z_0\right)^k z_0^{-k}}{k!}\quad\text{for (not } (z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0))$$

$$\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}=-\frac{1}{3\sqrt{\pi}}\,32\left(1+6\,e^{(2i\pi)/3}+9\,e^{(4i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\left(-1+e^{-2\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

1/4((((32^2)/6*(sqrt(e^-(2Pi))*(e^-(2Pi))^((3.86112*36)/2)+1/6(((8+8*(e^((2Pi*i)/3))+16*(e^((2Pi*i)/3)))))^2*(sqrt(e^-(2Pi)))+1/6(8+8*(e^((2Pi*i)/3))+16*(e^((2Pi*i)/3)))^2*(sqrt(e^-(2Pi))))))

Input interpretation:

$$\frac{1}{4}\left(\frac{32^2}{6}\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}+\frac{1}{6}\left(8+8\,e^{1/3\,(2\pi i)}+16\,e^{1/3\,(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{1/3\,(2\pi i)}+16\,e^{1/3\,(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}\right)$$

i is the imaginary unit

Result:

$-1.4980824998107713255131482219532377242252411401019468766649491\ldots-0.5987896162158574476047748010716519648471214354317877307763847 4\ldots\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 1.61332$ (radius), $\theta = -158.213°$ (angle)

1.61332 result that is a very good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$\frac{1}{4}\left(\frac{1}{6}\times 32^2\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}\right)=$$
$$\frac{16}{3}\left(1+6\,e^{(2i\pi)/3}+9\,e^{(4i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+e^{-2\pi}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

$$\frac{1}{4}\left(\frac{1}{6}\times 32^2\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}\right)=$$
$$\frac{16}{3}\left(1+6\,e^{(2i\pi)/3}+9\,e^{(4i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(e^{-2\pi}-z_0\right)^k z_0^{-k}}{k!}\quad\text{for (not }(z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

$$\frac{1}{4}\left(\frac{1}{6}\times 32^2\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}\right)=$$
$$-\frac{1}{3\sqrt{\pi}}\,8\left(1+6\,e^{(2i\pi)/3}+9\,e^{(4i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\left(-1+e^{-2\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

((((32^2)/6*(sqrt(e^-(2Pi)))*(e^-(2Pi))^((3.86112*36)/2)+1/6(((8+8*(e^((2Pi*i)/3))+16*(e^((2Pi*i)/3)))))^2*(sqrt(e^-(2Pi)))+1/6(8+8*(e^((2Pi*i)/3))+16*(e^((2Pi*i)/3)))^2*(sqrt(e^-(2Pi))))))^3-(11-1)i

Input interpretation:

$$\left(\frac{32^2}{6}\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}+\frac{1}{6}\left(8+8\,e^{1/3\,(2\pi i)}+16\,e^{1/3\,(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{1/3\,(2\pi i)}+16\,e^{1/3\,(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}\right)^3-(11-1)\,i$$

i is the imaginary unit

Result:

$-112.042588509438512126058870780301509581586866845043144502835890\ldots - 254.275678767681605454951696217358193087768537105139069300227701\ldots\,i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 277.866$ (radius), $\theta = -113.78°$ (angle)

277.866 result very near to the value of Planck multipole spectrum data 278.34

Series representations:

$$\left(\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}\right)^3-i\,(11-1)=$$

$$-10\,i+\frac{262\,144}{27}\left(1+6\,e^{(2 i\pi)/3}+9\,e^{(4 i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)^3\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+e^{-2\pi}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3$$

$$\left(\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}\right)^3-i\,(11-1)=-10\,i+\left(\sum_{k=0}^{\infty}\frac{1}{3\,k!}\,64\,(-1)^k\left(1+6\,e^{(2i\pi)/3}+9\,e^{(4i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)\left(-\frac{1}{2}\right)_k\sqrt{z_0}\left(e^{-2\pi}-z_0\right)^k z_0^{-k}\right)^3 \quad \text{for (not } (z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0))$$

$$\left(\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}\right)^3-i\,(11-1)=-10\,i+\left(\sum_{j=0}^{\infty}-\frac{1}{3\sqrt{\pi}}\,32\left(1+6\,e^{(2i\pi)/3}+9\,e^{(4i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)\left(\operatorname{Res}_{s=-j}\left(-1+e^{-2\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\right)^3$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

6.45328((((32^2)/6*(sqrt(e^-(2Pi)))(e^-(2Pi))^((3.86112*36)/2)+1/6(((8+8(e^((2Pi*i)/3))+16(e^((2Pi*i)/3)))))^2(sqrt(e^-(2Pi)))+1/6(8+8(e^((2Pi*i)/3))+16(e^((2Pi*i)/3)))^2(sqrt(e^-(2Pi))))))^3+5i

Input interpretation:

$$6.45328\left(\frac{32^2}{6}\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}+\frac{1}{6}\left(8+8\,e^{1/3\,(2\pi i)}+16\,e^{1/3\,(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{1/3\,(2\pi i)}+16\,e^{1/3\,(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}\right)^3+5\,i$$

i is the imaginary unit

Result:

$-723.042\ldots - 1571.38\ldots\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 1729.75$ (radius), $\theta = -114.709°$ (angle)

1729.75

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Series representations:

$$6.45328\left(\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\,\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}\right)^3+5\,i=$$
$$5\,i+62\,655.1\left(1+6\,e^{(2 i\pi)/3}+9\,e^{(4 i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)^3\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+e^{-2\pi}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3$$

$$6.45328\left(\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\,\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}\right)^3+5\,i=$$
$$5\,i+6.45328\left(\sum_{k=0}^{\infty}\frac{1}{3\,k!}\,64\,(-1)^k\left(1+6\,e^{(2 i\pi)/3}+9\,e^{(4 i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)\left(-\frac{1}{2}\right)_k\sqrt{z_0}\,\left(e^{-2\pi}-z_0\right)^k z_0^{-k}\right)^3 \quad \text{for (not } (z_0\in\mathbb{R} \text{ and } -\infty<z_0\leq 0))$$

$$6.45328\left(\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2 \sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{(2\pi i)/3}+16\,e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}\right)^3+5\,i=$$

$$\frac{1}{\sqrt{\pi}^3}\,5\left(i\sqrt{\pi}^3-0.00597526\left(512\left(e^{-2\pi}\right)^{69.5002}+\left(8+24\,e^{(2i\pi)/3}\right)^2\right)^3 \left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\left(-1+e^{-2\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^3\right)$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

16(((((32^2)/6(sqrt(e^-(2Pi)))(e^-(2Pi))^((3.86112*36)/2)+1/6(((8+8(e^((2Pi*i)/3))+16(e^((2Pi*i)/3)))))^2(sqrt(e^-(2Pi)))+1/6(8+8(e^((2Pi*i)/3))+16(e^((2Pi*i)/3)))^2(sqrt(e^-(2Pi))))))^3+(2*7)i)+i

Input interpretation:

$$16\left(\left(\frac{32^2}{6}\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}+\frac{1}{6}\left(8+8\,e^{1/3(2\pi i)}+16\,e^{1/3(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}+\frac{1}{6}\left(8+8\,e^{1/3(2\pi i)}+16\,e^{1/3(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}\right)^3+(2\times 7)\,i\right)+i$$

i is the imaginary unit

Result:

$$-1792.681416151016194016941932484824153305389869520690312045374 24\ldots - 3683.41086028290568727922713947773108940429659368222510880364322\ldots\, i$$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 4096.49$ (radius), $\theta = -115.952°$ (angle)

$4096.49 \approx 4096$

Series representations:

$$16\left(\left(\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2 + \frac{1}{6}\left(8 + 8e^{(2\pi i)/3} + 16e^{(2\pi i)/3}\right)^2 \sqrt{e^{-(2\pi)}} + \frac{1}{6}\left(8 + 8e^{(2\pi i)/3} + 16e^{(2\pi i)/3}\right)^2 \sqrt{e^{-(2\pi)}}\right)^3 + i\,2\times 7\right) + i = i + 16\left(14\,i + \left(\sum_{k=0}^{\infty}\frac{1}{3\,k!}\,64\,(-1)^k\left(-1 + e^{-2\pi}\right)^k \left(1 + 6e^{(2i\pi)/3} + 9e^{(4i\pi)/3} + 8\left(e^{-2\pi}\right)^{69.5002}\right)\left(-\frac{1}{2}\right)_k\right)^3\right)$$

$$16\left(\left(\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2 + \frac{1}{6}\left(8 + 8e^{(2\pi i)/3} + 16e^{(2\pi i)/3}\right)^2 \sqrt{e^{-(2\pi)}} + \frac{1}{6}\left(8 + 8e^{(2\pi i)/3} + 16e^{(2\pi i)/3}\right)^2 \sqrt{e^{-(2\pi)}}\right)^3 + i\,2\times 7\right) + i = i + 16\left(14\,i + \left(\sum_{k=0}^{\infty}\frac{1}{3\,k!}\,64\,(-1)^k\left(1 + 6e^{(2i\pi)/3} + 9e^{(4i\pi)/3} + 8\left(e^{-2\pi}\right)^{69.5002}\right)\left(-\frac{1}{2}\right)_k \sqrt{z_0}\left(e^{-2\pi} - z_0\right)^k z_0^{-k}\right)^3\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

$$\begin{aligned}&16\Bigg(\Bigg(\frac{1}{6}\left(\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.86112\times 36)/2}\right)32^2+\\&\qquad\frac{1}{6}\left(8+8e^{(2\pi i)/3}+16e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}+\\&\qquad\frac{1}{6}\left(8+8e^{(2\pi i)/3}+16e^{(2\pi i)/3}\right)^2\sqrt{e^{-(2\pi)}}\Bigg)^3+i\,2\times 7\Bigg)+i=\\&i+16\Bigg(14i+\Bigg(\sum_{j=0}^{\infty}-\frac{1}{3\sqrt{\pi}}\,32\left(1+6e^{(2i\pi)/3}+9e^{(4i\pi)/3}+8\left(e^{-2\pi}\right)^{69.5002}\right)\\&\qquad\left(\operatorname{Res}_{s=-j}\left(-1+e^{-2\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\Bigg)^3\Bigg)\end{aligned}$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

(6.4533((((32^2)/6(sqrt(e^-(2Pi)))(e^-(2Pi))^((3.8611*36)/2)+1/6(((8+8(e^((2Pi*i)/3))+16(e^((2Pi*i)/3)))))^2(sqrt(e^-(2Pi)))+1/6(8+8(e^((2Pi*i)/3))+16(e^((2Pi*i)/3)))^2(sqrt(e^-(2Pi))))))^3+5i)^1/15

Input interpretation:

$$\begin{aligned}&\Bigg(6.4533\Bigg(\frac{32^2}{6}\sqrt{e^{-(2\pi)}}\left(e^{-(2\pi)}\right)^{(3.8611\times 36)/2}+\\&\qquad\frac{1}{6}\left(8+8e^{1/3(2\pi i)}+16e^{1/3(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}+\\&\qquad\frac{1}{6}\left(8+8e^{1/3(2\pi i)}+16e^{1/3(2\pi i)}\right)^2\sqrt{e^{-(2\pi)}}\Bigg)^3+5i\Bigg)\,\hat{}\,(1/15)\end{aligned}$$

i is the imaginary unit

Result:

$1.62924\ldots -$
$0.218755\ldots i$

(using the principal branch of the logarithm for complex exponentiation)

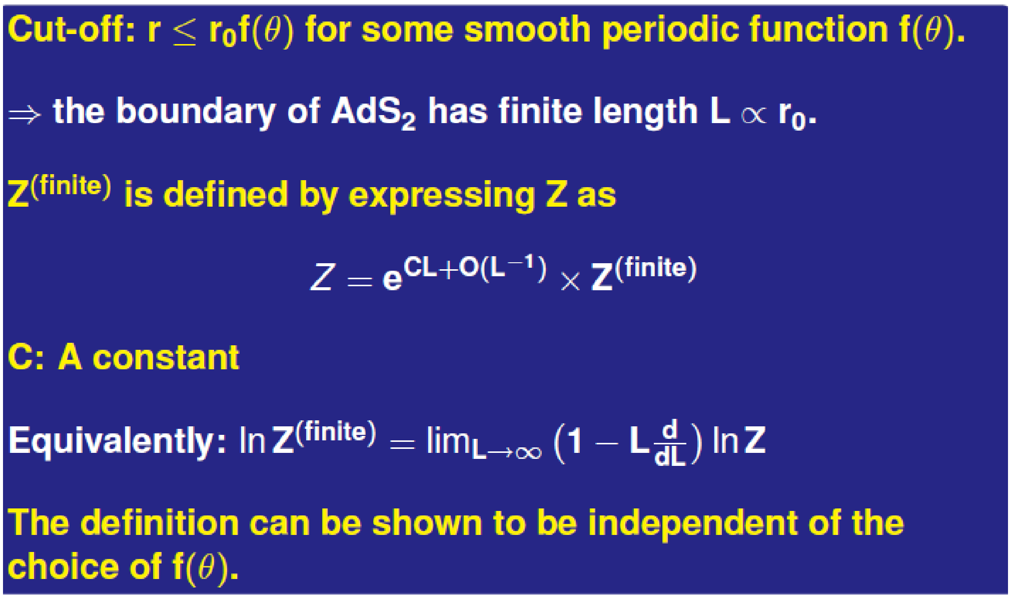
Polar coordinates:

$r = 1.64386$ (radius), $\theta = -7.64725°$ (angle)

$1.64386 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

From:

Extremal Black Hole Entropy - *Ashoke Sen* - Harish-Chandra Research Institute, Allahabad, India – October 2009



Cut-off: $r \leq r_0 f(\theta)$ for some smooth periodic function $f(\theta)$.

$\Rightarrow$ the boundary of AdS_2 has finite length $L \propto r_0$.

$Z^{(finite)}$ is defined by expressing Z as

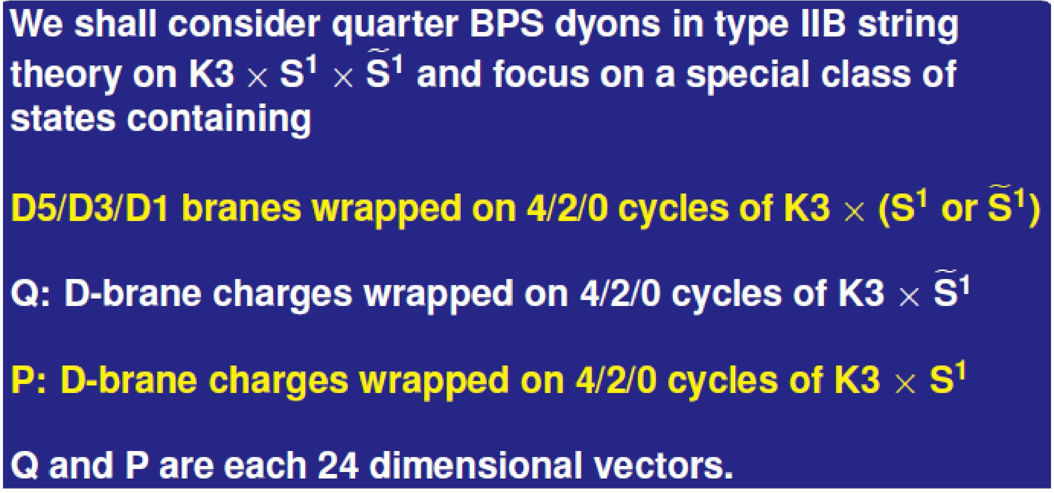
$$Z = e^{CL+O(L^{-1})} \times Z^{(finite)}$$

C: A constant

Equivalently: $\ln Z^{(finite)} = \lim_{L\to\infty} \left(1 - L\frac{d}{dL}\right) \ln Z$

The definition can be shown to be independent of the choice of $f(\theta)$.

L = length; C = constant; We consider L = 2 and C = 3; CL = 6



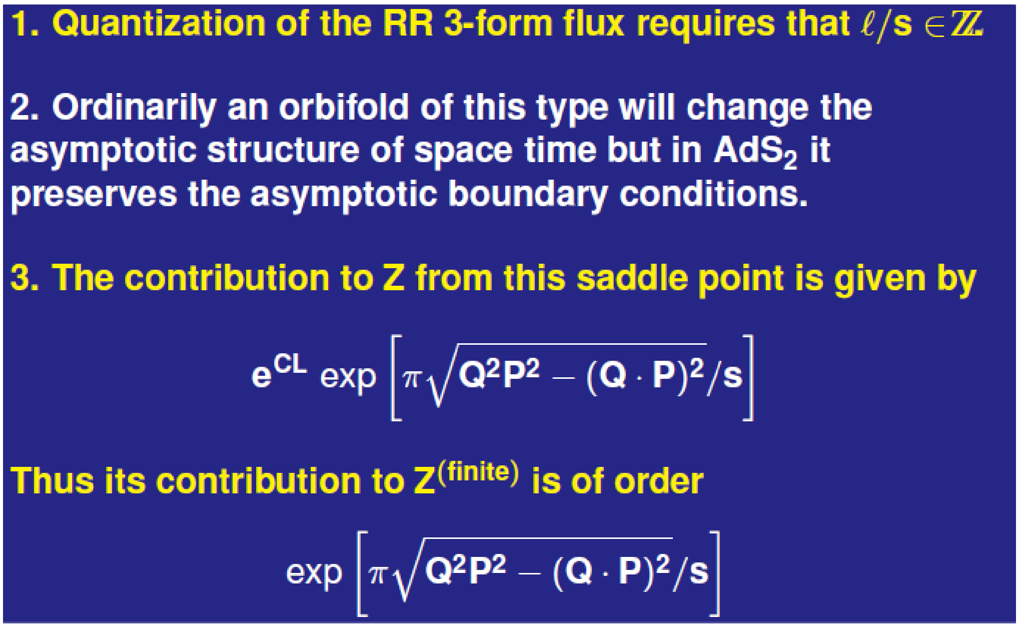
We shall consider quarter BPS dyons in type IIB string theory on $K3 \times S^1 \times \widetilde{S}^1$ and focus on a special class of states containing

D5/D3/D1 branes wrapped on 4/2/0 cycles of $K3 \times (S^1$ or $\widetilde{S}^1)$

Q: D-brane charges wrapped on 4/2/0 cycles of $K3 \times \widetilde{S}^1$

P: D-brane charges wrapped on 4/2/0 cycles of $K3 \times S^1$

Q and P are each 24 dimensional vectors.



1. Quantization of the RR 3-form flux requires that $\ell/s \in \mathbb{Z}$

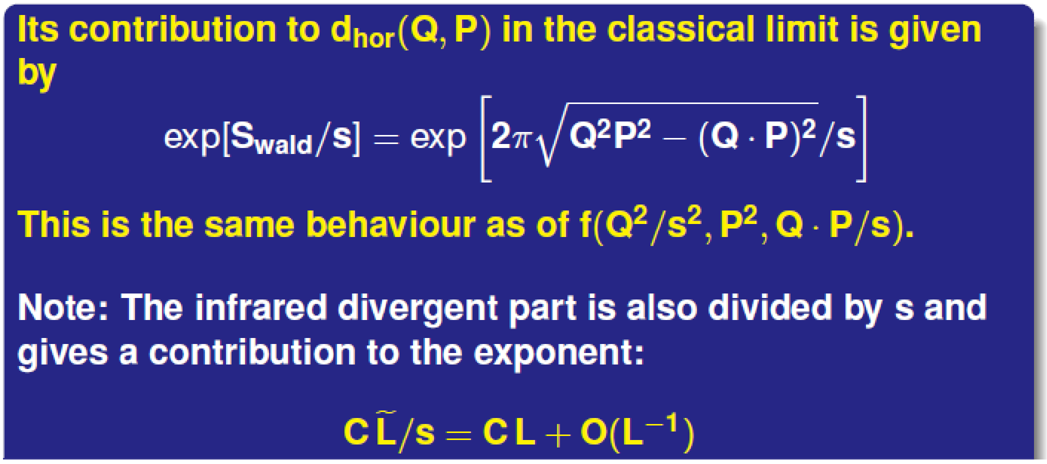
2. Ordinarily an orbifold of this type will change the asymptotic structure of space time but in AdS_2 it preserves the asymptotic boundary conditions.

3. The contribution to Z from this saddle point is given by

$$e^{CL} \exp\left[\pi\sqrt{Q^2P^2 - (Q\cdot P)^2}/s\right]$$

Thus its contribution to $Z^{(finite)}$ is of order

$$\exp\left[\pi\sqrt{Q^2P^2 - (Q\cdot P)^2}/s\right]$$



Its contribution to $d_{hor}(Q,P)$ in the classical limit is given by

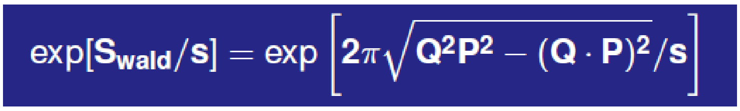
$$\exp[S_{wald}/s] = \exp\left[2\pi\sqrt{Q^2P^2 - (Q\cdot P)^2}/s\right]$$

This is the same behaviour as of $f(Q^2/s^2, P^2, Q\cdot P/s)$.

Note: The infrared divergent part is also divided by s and gives a contribution to the exponent:

$$C\tilde{L}/s = CL + O(L^{-1})$$

from the above expression,



$$\exp[S_{wald}/s] = \exp\left[2\pi\sqrt{Q^2P^2 - (Q\cdot P)^2}/s\right]$$

Whence,

For: $Q^2 > 0$, $P^2 > 0$, and $(Q \cdot P)^2 < Q^2 P^2$; $s = (1,\dots19)$; $s = 8$; $9 > 0$; $25 > 0$

(2*7)^2 < 25*9 ; 196 < 225 ; $Q^2 P^2 = 225$ $(Q \cdot P)^2 = 196$

$(Q = 3;\ \ P = 5;\ \ P^2 = 25) = a \qquad [Q^2\,P^2 = 225 \quad (Q \cdot P)^2 = 196] = S$

We obtain:

Exp[2Pi*sqrt(225-196) * 1/8]

Input:

$$\exp\left(2\,\pi\,\sqrt{225-196}\times\frac{1}{8}\right)$$

Exact result:

$$e^{\left(\sqrt{29}\,\pi\right)/4}$$

Decimal approximation:

68.682782495160562268885830027229902806145785829706890646386565832…

68.68278249…

Property:

$e^{\left(\sqrt{29}\,\pi\right)/4}$ is a transcendental number

Series representations:

$$e^{2/8\,\pi\,\sqrt{225-196}} = e^{1/4\,\pi\,\sqrt{28}\,\sum_{k=0}^{\infty} 28^{-k}\binom{1/2}{k}}$$

$$e^{2/8\,\pi\,\sqrt{225-196}} = \exp\left(\frac{1}{4}\,\pi\,\sqrt{28}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{2/8\,\pi\sqrt{225-196}} = \exp\left(\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{8\sqrt{\pi}}\right)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0 < \gamma < -\operatorname{Re}(a) \text{ and } |\arg(z)| < \pi)$$

(55+2)/((1/2((Exp[2Pi*sqrt(225-196) * 1/8]))))

Input:

$$\frac{55+2}{\frac{1}{2}\exp\left(2\,\pi\sqrt{225-196}\times\frac{1}{8}\right)}$$

Exact result:

$$114\,e^{-(\sqrt{29}\,\pi)/4}$$

Decimal approximation:

1.6598046243690334055037633657221477513628336745299590351888778016…

1.659804624369…. result that is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Property:

$114\,e^{-(\sqrt{29}\,\pi)/4}$ is a transcendental number

Series representations:

$$\frac{55+2}{\frac{1}{2}\exp\left(\frac{2}{8}\,\pi\sqrt{225-196}\right)} = \frac{114}{\exp\left(\frac{1}{4}\,\pi\sqrt{28}\sum_{k=0}^{\infty} 28^{-k}\binom{\frac{1}{2}}{k}\right)}$$

$$\frac{55+2}{\frac{1}{2}\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)} = \frac{114}{\exp\left(\frac{1}{4}\pi\sqrt{28}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}$$

$$\frac{55+2}{\frac{1}{2}\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)} = \frac{114}{\exp\left(\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}\, 28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{8\sqrt{\pi}}\right)}$$

From:

$$\exp\left[\pi\sqrt{\mathbf{Q}^2\mathbf{P}^2-(\mathbf{Q}\cdot\mathbf{P})^2/\mathbf{s}}\right]$$

Exp[Pi*sqrt(225-196) * 1/8]

Input:

$$\exp\left(\pi\sqrt{225-196}\times\frac{1}{8}\right)$$

Exact result:

$$e^{\left(\sqrt{29}\,\pi\right)/8}$$

Decimal approximation:

8.2875076165974388966720737666935471309306965676624261823030657204
…

8.28750761659…

Property:

$e^{\left(\sqrt{29}\,\pi\right)/8}$ is a transcendental number

Series representations:

$$e^{1/8\,\pi\sqrt{225-196}} = e^{1/8\,\pi\sqrt{28}\,\sum_{k=0}^{\infty} 28^{-k}\binom{1/2}{k}}$$

$$e^{1/8\,\pi\sqrt{225-196}} = \exp\left(\frac{1}{8}\,\pi\sqrt{28}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{1/8\,\pi\sqrt{225-196}} = \exp\left(\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}\,28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{16\sqrt{\pi}}\right)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\operatorname{Re}(a) \text{ and } |\arg(z)|<\pi)$$

1/5* Exp[Pi*sqrt(225-196) * 1/8]

Input:

$$\frac{1}{5}\exp\left(\pi\sqrt{225-196}\times\frac{1}{8}\right)$$

Exact result:

$$\frac{1}{5}\,e^{\left(\sqrt{29}\,\pi\right)/8}$$

Decimal approximation:

1.6575015233194877793344147533387094261861393135324852364606131440

…

1.6575015233…. result that is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164.2696 i.e. 1.65578...

Property:

$\frac{1}{5} e^{\left(\sqrt{29}\,\pi\right)/8}$ is a transcendental number

Series representations:

$$\frac{1}{5}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right) = \frac{1}{5}\exp\left(\frac{1}{8}\pi\sqrt{28}\sum_{k=0}^{\infty} 28^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{1}{5}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right) = \frac{1}{5}\exp\left(\frac{1}{8}\pi\sqrt{28}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{1}{5}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right) = \frac{1}{5}\exp\left(\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{16\sqrt{\pi}}\right)$$

We note that:

(((Exp[2Pi*sqrt(225-196) * 1/8]))) / (((Exp[Pi*sqrt(225-196) * 1/8])))

Input:

$$\frac{\exp\left(2\pi\sqrt{225-196}\times\frac{1}{8}\right)}{\exp\left(\pi\sqrt{225-196}\times\frac{1}{8}\right)}$$

Exact result:

$e^{(\sqrt{29}\,\pi)/8}$

Decimal approximation:

8.2875076165974388966720737666935471309306965676624261823030657204

…

8.28750761659…

Property:

$e^{(\sqrt{29}\,\pi)/8}$ is a transcendental number

Series representations:

$$\frac{\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)}{\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)}=\frac{\exp\left(\frac{1}{4}\pi\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)}{\exp\left(\frac{1}{8}\pi\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)}$$

$$\frac{\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)}{\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)}=\frac{\exp\left(\frac{1}{4}\pi\sqrt{28}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}{\exp\left(\frac{1}{8}\pi\sqrt{28}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}$$

$$\frac{\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)}{\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)}=\frac{\exp\left(\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{8\sqrt{\pi}}\right)}{\exp\left(\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{16\sqrt{\pi}}\right)}$$

(((Exp[2Pi*sqrt(225-196) * 1/8]))) * (((Exp[Pi*sqrt(225-196) * 1/8])))

Input:

$$\exp\left(2\pi\sqrt{225-196}\times\frac{1}{8}\right)\exp\left(\pi\sqrt{225-196}\times\frac{1}{8}\right)$$

Exact result:

$$e^{(3\sqrt{29}\,\pi)/8}$$

Decimal approximation:

569.20908305774840874051030418832789493296813592765101743621665775…

569.209083… result very near to the value of the Phi frequencies Table 568.729

Property:

$e^{(3\sqrt{29}\,\pi)/8}$ is a transcendental number

Series representations:

$$\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)= \exp\left(\frac{1}{8}\pi\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)\exp\left(\frac{1}{4}\pi\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)= \exp\left(\frac{1}{8}\pi\sqrt{28}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\exp\left(\frac{1}{4}\pi\sqrt{28}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)=$$
$$\exp\left(\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{16\sqrt{\pi}}\right)$$
$$\exp\left(\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{8\sqrt{\pi}}\right)$$

1/351.494((((((Exp[2Pi*sqrt(225-196) * 1/8]))) * (((Exp[Pi*sqrt(225-196) * 1/8]))))))

Where 351.494 is a value of the Frequency System based on Phi

Input interpretation:

$$\frac{1}{351.494}\left(\exp\left(2\pi\sqrt{225-196}\times\frac{1}{8}\right)\exp\left(\pi\sqrt{225-196}\times\frac{1}{8}\right)\right)$$

Result:

1.6193991449576618910721386543961714707305619325725361384154968726
…

1.6193991449…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$\frac{\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)}{351.494}=$$
$$0.002845\exp\left(\frac{1}{8}\pi\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)\exp\left(\frac{1}{4}\pi\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)}{351.494} = 0.002845\exp\left(\frac{1}{8}\pi\sqrt{28}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\exp\left(\frac{1}{4}\pi\sqrt{28}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp\left(\frac{2}{8}\pi\sqrt{225-196}\right)\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)}{351.494} = 0.002845\exp\left(\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{16\sqrt{\pi}}\right)\exp\left(\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{8\sqrt{\pi}}\right)$$

From:

Quantum Black Holes - *Atish Dabholkar*

We have:

The entropy function (10.11) is invariant under these transformations. Since at its extremum with respect to u_{Mij} the entropy function depends only on $\vec{P}$, $\vec{Q}$, v_1, v_2, u_S and u_a it must be a function of the $O(22,6)$ invariant combinations:

$$Q^2 = Q_i L_{ij} Q_j, \quad P^2 = P_i L_{ij} P_j, \quad Q \cdot P = Q_i L_{ij} P_j \,, \tag{10.15}$$

besides v_1, v_2, u_S and u_a. Let us for definiteness take $Q^2 > 0$, $P^2 > 0$, and $(Q \cdot P)^2 < Q^2 P^2$. In that case with the help of an $SO(22,6)$ transformation we can make

$$(I_r - L)_{ij} Q_j = 0, \quad (I_r - L)_{ij} P_j = 0 \,, \tag{10.16}$$

where I_r denotes the $r \times r$ identity matrix. This is most easily seen by diagonalizing L to the form

$$\begin{pmatrix} -I_{22} & 0 \\ 0 & I_6 \end{pmatrix} . \tag{10.17}$$

In this case Q and P satisfying (10.16) will have

$$Q_i = 0, \quad P_i = 0, \quad \text{for } 1 \le i \le 22 \,. \tag{10.18}$$

Let us now see that for P and Q satisfying this condition, every term in (10.11) is extremized with respect to u_M for

$$u_M = I_r \,. \tag{10.19}$$

Clearly a variation δu_{Mij} with either i or j in the range $[7, r]$ will give vanishing contribution to each term in $\delta\mathcal{E}$ computed from (10.11). On the other hand due to the constraint (9.9) on M, any variation δM_{ij} (and hence δu_{Mij}) with $1 \le i, j \le 6$ must vanish, since in this subspace satisfying (9.9) requires M to be both symmetric and orthogonal. Thus each term in $\delta\mathcal{E}$ vanishes under all allowed variations of u_M.

We should emphasize that (10.19) is not the only possible value of u_M that extremizes $\mathcal{E}$. Any u_M related to (10.19) by an $O(22,6)$ transformation that preserves the vectors $\vec{Q}$ and $\vec{P}$ will extremize $\mathcal{E}$. Thus there is a family of extrema representing flat directions of $\mathcal{E}$. However as we have argued in §4, the value of the entropy is independent of the choice of u_M.

$$\phi(\lambda, \bar{\lambda}) = -\frac{1}{64\pi^2} \left[12 \log(S) + 24 \log\left(\eta(a - iS)\right) + 24 \log\left(\eta(a + iS)\right) \right] \tag{13.8}$$

Consequently, the Wald entropy corrected to this order is then given by

$$S_{wald} = \pi \sqrt{Q^2 P^2 - (Q \cdot P)^2} + 64\pi^2 \phi \left(a = \frac{Q \cdot P}{P^2} \,,\, S = \frac{\sqrt{Q^2 P^2 - (Q \cdot P)^2}}{P^2} \right) + \dots \tag{13.10}$$

The Dedekind η function is defined as

$$\eta(\tau) = q^{\frac{1}{24}} \prod_{n=1}^{\infty} (1 - q^n) \,. \tag{B.20}$$

$q = e^{2\pi i\tau}$; Im $\tau > 0$; $q = e^{2\pi}$

(Exp(2Pi))^(1/24) product (1-(exp(2Pi))^n), n = 1..1/196884

Input interpretation:

$$\sqrt[24]{\exp(2\pi)} \prod_{n=1}^{\frac{1}{196\,884}} \left(1 - \exp^n(2\pi)\right)$$

Result:

$e^{\pi/12} \approx 1.29927$

$\eta(\tau) = 1.29927$

(Exp(2Pi))^(1/24) product (1-(exp(2Pi))^n), n = 1..1/21493760

Input interpretation:

$$\sqrt[24]{\exp(2\pi)} \prod_{n=1}^{\frac{1}{21\,493\,760}} \left(1 - \exp^n(2\pi)\right)$$

Result:

$e^{\pi/12} \approx 1.29927$

1.29927

where 196884 and 21493760 are values belonging to the following partition function:

$$\begin{aligned} Z_{24}(\tau) &= j(\tau) - 744 \\ &= q^{-1} + 196884\, q + 21493760\, q^2 + 864299970\, q^3 + 20245856256\, q^4 + \ldots \,, \end{aligned}$$

where $j(\tau)$ is the modular j-function and $q = e^{2\pi i\tau}$.

η = e^(Pi/12) = 1.29927

$Q^2 > 0$, $P^2 > 0$ and $(Q \cdot P)^2 < Q^2 P^2$; s = (1,…19) ; s = 8 ; 9 > 0 ; 25 > 0

(2*7)^2 < 25*9 ; 196 < 225 ; $Q^2 P^2 = 225$ $(Q \cdot P)^2 = 196$

(Q = 3; P = 5; $P^2 = 25$) = a [$Q^2 P^2 = 225$ $(Q \cdot P)^2 = 196$] = S

We have :

$$\phi(\lambda, \bar{\lambda}) = -\frac{1}{64\pi^2}\left[12\log(S) + 24\log\left(\eta(a - iS)\right) + 24\log\left(\eta(a + iS)\right)\right] \qquad (13.8)$$

-1/(64Pi^2) [12 ln(sqrt(29)/49) + 24 ln(1.29927(3/5-i*(sqrt(29)/49)) + 24 ln(1.29927(3/5+i*(sqrt(29)/49))

Input interpretation:

$$-\frac{12\log\left(\frac{\sqrt{29}}{49}\right) + 24\log\left(1.29927\left(\frac{3}{5} - i\times\frac{\sqrt{29}}{49}\right)\right) + 24\log\left(1.29927\left(\frac{3}{5} + i\times\frac{\sqrt{29}}{49}\right)\right)}{64\,\pi^2}$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

$-0.0284746\ldots - 0.0920351\ldots\, i$

Polar coordinates:

$r = 0.0963393$ (radius), $\theta = -107.191°$ (angle)

0.0963393

Alternative representations:

$$\frac{\left(12\log\left(\frac{\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}-\frac{i\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}+\frac{i\sqrt{29}}{49}\right)\right)\right)\right)(-1)}{64\pi^2}=$$

$$-\frac{1}{64\pi^2}\left(12\log(a)\log_a\left(\frac{\sqrt{29}}{49}\right)+24\log(a)\log_a\left(24\log\left(1.29927\left(\frac{3}{5}+\frac{i\sqrt{29}}{49}\right)\right)+1.29927\left(\frac{3}{5}-\frac{i\sqrt{29}}{49}\right)\right)\right)$$

$$\frac{\left(12\log\left(\frac{\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}-\frac{i\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}+\frac{i\sqrt{29}}{49}\right)\right)\right)\right)(-1)}{64\pi^2}=$$

$$-\frac{12\log_e\left(\frac{\sqrt{29}}{49}\right)+24\log_e\left(24\log\left(1.29927\left(\frac{3}{5}+\frac{i\sqrt{29}}{49}\right)\right)+1.29927\left(\frac{3}{5}-\frac{i\sqrt{29}}{49}\right)\right)}{64\pi^2}$$

$$\frac{\left(12\log\left(\frac{\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}-\frac{i\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}+\frac{i\sqrt{29}}{49}\right)\right)\right)\right)(-1)}{64\pi^2}=$$

$$-\frac{1}{64\pi^2}\left(-12\,\mathrm{Li}_1\left(1-\frac{\sqrt{29}}{49}\right)-24\,\mathrm{Li}_1\left(1-24\log\left(1.29927\left(\frac{3}{5}+\frac{i\sqrt{29}}{49}\right)\right)-1.29927\left(\frac{3}{5}-\frac{i\sqrt{29}}{49}\right)\right)\right)$$

Series representations:

$$\frac{\left(12\log\left(\frac{\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}-\frac{i\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}+\frac{i\sqrt{29}}{49}\right)\right)\right)\right)(-1)}{64\pi^2}=$$

$$-\frac{1}{16\pi^2}\,3\left(\log\left(\frac{1}{49}\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)+2\log\left(0.779562+24\log\left(0.779562+0.0265157\,i\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)-0.0265157\,i\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$\frac{\left(12\log\left(\frac{\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}-\frac{i\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}+\frac{i\sqrt{29}}{49}\right)\right)\right)\right)(-1)}{64\pi^2} =$$

$$-\frac{1}{16\pi^2}\,3\left(3\log(z_0)+\left\lfloor\frac{\arg\left(\frac{\sqrt{29}}{49}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)+\right.$$

$$2\left\lfloor\frac{1}{2\pi}\arg\left(0.779562+24\log\left(0.779562+0.0265157\,i\sqrt{29}\right)-\right.\right.$$

$$\left.\left.0.0265157\,i\sqrt{29}-z_0\right)\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)+$$

$$\sum_{k=1}^{\infty}\frac{1}{k}(-1)^{1+k}\left(\left(\frac{\sqrt{29}}{49}-z_0\right)^k+2\left(0.779562+24\log\left(0.779562+\right.\right.\right.$$

$$\left.\left.\left.\left.0.0265157\,i\sqrt{29}\right)-0.0265157\,i\sqrt{29}-z_0\right)^k\right)z_0^{-k}\right)$$

$$\frac{\left(12\log\left(\frac{\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}-\frac{i\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}+\frac{i\sqrt{29}}{49}\right)\right)\right)\right)(-1)}{64\pi^2} =$$

$$-\frac{3\,\mathcal{A}\left\lfloor\frac{\arg\left(-x+\frac{\sqrt{29}}{49}\right)}{2\pi}\right\rfloor}{8\pi}-$$

$$\frac{3\,\mathcal{A}\left\lfloor\frac{\arg\left(0.779562-x+24\log\left(0.779562+0.0265157\,i\sqrt{29}\right)-0.0265157\,i\sqrt{29}\right)}{2\pi}\right\rfloor}{4\pi}-$$

$$\frac{9\log(x)}{16\pi^2}+\sum_{k=1}^{\infty}\frac{1}{16\,k\,\pi^2}\,3(-1)^k x^{-k}\left(\left(-x+\frac{\sqrt{29}}{49}\right)^k+\right.$$

$$2\left(0.779562-x+24\log\left(0.779562+0.0265157\,i\sqrt{29}\right)-\right.$$

$$\left.\left.0.0265157\,i\sqrt{29}\right)^k\right)\quad\text{for } x<0$$

Integral representation:

$$\frac{\left(12\log\left(\frac{\sqrt{29}}{49}\right)+24\log\left(1.29927\left(\frac{3}{5}-\frac{i\sqrt{29}}{49}\right)\right)+24\log\left(1.29927\left(\frac{3}{5}+\frac{i\sqrt{29}}{49}\right)\right)\right)(-1)}{64\pi^2}=$$

$$\int_1^{\frac{\sqrt{29}}{49}}\Big(\big(0.00609033+(0.1875-0.5625\,t)\log\big(0.779562+0.0265157\,i\sqrt{29}\big)-$$
$$0.000159439\sqrt{29}-0.000207154\,i\sqrt{29}+$$
$$t\left(0.00516652+0.000621462\,i\sqrt{29}\right)\big)\Big/$$
$$\big(\pi^2\,t\,\big(-0.0324818+(-1+t)\log\big(0.779562+0.0265157\,i\sqrt{29}\big)+$$
$$0.00085034\sqrt{29}+0.00110482\,i\sqrt{29}+$$
$$t\left(-0.00918492-0.00110482\,i\sqrt{29}\right)\big)\big)\Big)\,dt$$

Whence:

$$S_{wald}=\pi\sqrt{Q^2P^2-(Q\cdot P)^2}+64\pi^2\phi\left(a=\frac{Q\cdot P}{P^2}\,,\,S=\frac{\sqrt{Q^2P^2-(Q\cdot P)^2}}{P^2}\right)$$

Pi*sqrt(225-196) + 64*Pi^2*(-0.0284746 - 0.0920351i)

Input interpretation:

$$\pi\sqrt{225-196}+64\pi^2(-0.0284746+i\times(-0.0920351))$$

i is the imaginary unit

Result:

$-1.06812\ldots-$
$58.1344\ldots i$

Polar coordinates:

$r = 58.1442$ (radius), $\theta = -91.0526°$ (angle)

58.1442

1/5* [Pi*sqrt(225-196) + 64*Pi^2*(-0.0284746 - 0.0920351i)]

Input interpretation:

$$\frac{1}{5}\left(\pi\sqrt{225-196}+64\pi^2(-0.0284746+i\times(-0.0920351))\right)$$

i is the imaginary unit

Result:

$-0.213624\ldots -$
$11.6269\ldots i$

Polar coordinates:

$r = 11.6288$ (radius), $\theta = -91.0526°$ (angle)

11.6288 result very near to the black hole entropy value ln(139503) = 11.845841…

Series representations:

$$\frac{1}{5}\left(\pi\sqrt{225-196} + 64\pi^2(-0.0284746 - i\,0.0920351)\right) = -0.364475\,\pi^2 - 1.17805\,i\,\pi^2 + \frac{1}{5}\pi\sqrt{28}\sum_{k=0}^{\infty} 28^{-k}\binom{\frac{1}{2}}{k}$$

$$\frac{1}{5}\left(\pi\sqrt{225-196} + 64\pi^2(-0.0284746 - i\,0.0920351)\right) = -0.364475\,\pi^2 - 1.17805\,i\,\pi^2 + \frac{1}{5}\pi\sqrt{28}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{28}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

$$\frac{1}{5}\left(\pi\sqrt{225-196} + 64\pi^2(-0.0284746 - i\,0.0920351)\right) = -0.364475\,\pi^2 - 1.17805\,i\,\pi^2 + \frac{0.1\,\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 28^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}$$

((Pi*sqrt(225-196) + 64*Pi^2*(-0.0284746 - 0.0920351i)))^1/8

Input interpretation:

$$\sqrt[8]{\pi\sqrt{225-196}+64\,\pi^2\,(-0.0284746+i\times(-0.0920351))}$$

i is the imaginary unit

Result:

$1.629062\ldots -$
$0.3279314\ldots\, i$

Polar coordinates:

$r = 1.66174$ (radius), $\theta = -11.3816°$ (angle)

1.66174 result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Or, for ϕ = 0.9991104684:

Pi*sqrt(225-196) + 64*Pi^2*0.9991104684

Input interpretation:

$$\pi\sqrt{225-196}+64\,\pi^2\times0.9991104684$$

Result:

648.0107991…

648.0107991….. result very near to the value of Planck multipole spectrum data 645.593

sqrt(((Pi*sqrt(225-196) + 64*Pi^2*0.9991104684)))

Input interpretation:

$$\sqrt{\pi\sqrt{225-196}+64\,\pi^2\times0.9991104684}$$

Result:

25.45605624…

25.45605624…..result very near to the S_{BH} black hole entropy 25.1327

All 2nd roots of 648.011:

$25.4561\, e^{0} \approx 25.456$ (real, principal root)

$25.4561\, e^{i\pi} \approx -25.456$ (real root)

Series representations:

$$\sqrt{\pi \sqrt{225-196} + 64\pi^2\, 0.99911} = \sqrt{-1 + 63.9431\pi^2 + \pi\sqrt{29}} \sum_{k=0}^{\infty} \binom{\frac{1}{2}}{k} \left(-1 + 63.9431\pi^2 + \pi\sqrt{29}\right)^{-k}$$

$$\sqrt{\pi \sqrt{225-196} + 64\pi^2\, 0.99911} = \sqrt{-1 + 63.9431\pi^2 + \pi\sqrt{29}} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(-1 + 63.9431\pi^2 + \pi\sqrt{29}\right)^{-k}}{k!}$$

$$\sqrt{\pi \sqrt{225-196} + 64\pi^2\, 0.99911} = \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(63.9431\pi^2 + \pi\sqrt{29} - z_0\right)^k z_0^{-k}}{k!}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

(((Pi*sqrt(225-196) + 64*Pi^2*0.9991104684)))^1/13

Input interpretation:

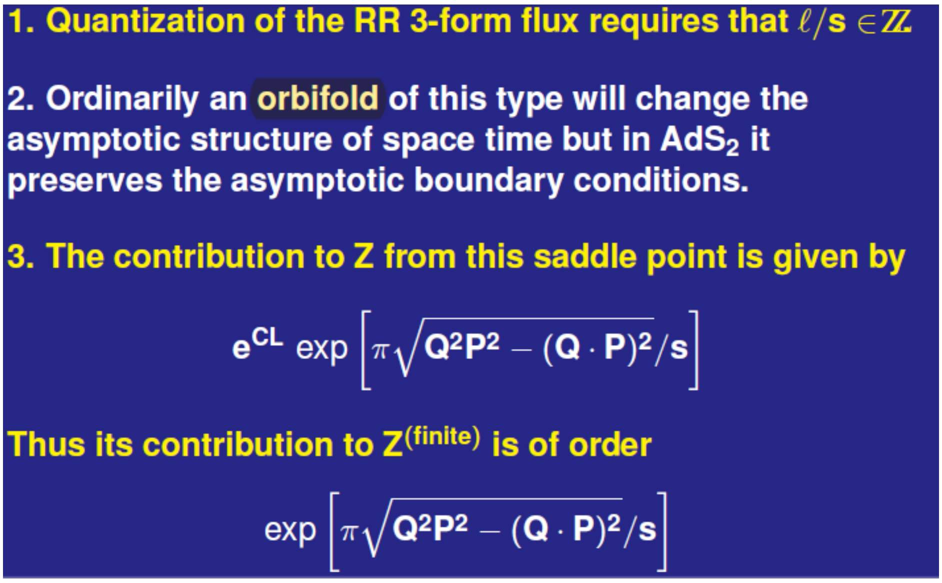
$$\sqrt[13]{\pi\sqrt{225-196}+64\,\pi^2\times 0.9991104684}$$

Result:

1.6454153981…

$$1.6454153981\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$$

We have that (see reference A. Sen talk):



1. Quantization of the RR 3-form flux requires that $\ell/s \in \mathbb{Z}$

2. Ordinarily an orbifold of this type will change the asymptotic structure of space time but in AdS_2 it preserves the asymptotic boundary conditions.

3. The contribution to Z from this saddle point is given by

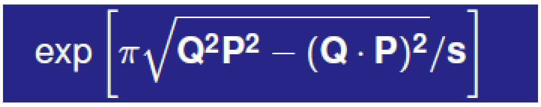
$$e^{CL}\exp\left[\pi\sqrt{Q^2P^2-(Q\cdot P)^2}/s\right]$$

Thus its contribution to $Z^{(finite)}$ is of order

$$\exp\left[\pi\sqrt{Q^2P^2-(Q\cdot P)^2}/s\right]$$

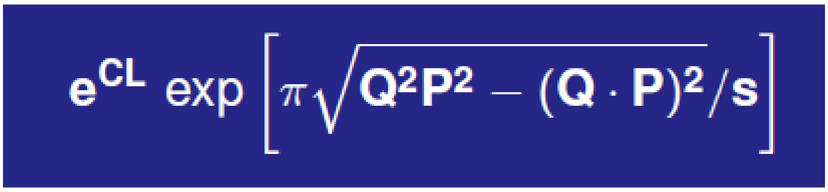
For CL = 6 and

from:



$$\exp\left[\pi\sqrt{Q^2P^2-(Q\cdot P)^2}/s\right]$$

We obtain, from the above already calculated expression, from



$$e^{CL}\exp\left[\pi\sqrt{Q^2P^2-(Q\cdot P)^2}/s\right]$$

e^6 *exp[Pi*sqrt(225-196) * 1/8]

Input:

$$e^6\exp\left(\pi\sqrt{225-196}\times\frac{1}{8}\right)$$

Exact result:

$$e^{6+(\sqrt{29}\,\pi)/8}$$

Decimal approximation:

3343.4191988257576225577481087369725329170368808969589323489481356…

3343.4191988…

Alternative representations:

$$e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)=z^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)\text{ for } z=e$$

$$e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)=w^a\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)\text{ for } a=\frac{6}{\log(w)}$$

$$e^{6} \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) = \exp\left(\frac{\pi \sqrt{29}}{8}\right)\left(1 + \frac{2}{-1+\coth(3)}\right)$$

Series representations:

$$e^{6} \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) = \exp\left(\frac{1}{8} \pi \sqrt{28} \sum_{k=0}^{\infty} 28^{-k} \binom{\frac{1}{2}}{k}\right) \sum_{k=-\infty}^{\infty} I_k(6)$$

$$e^{6} \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) = \exp\left(\frac{1}{8} \pi \exp\left(i \pi \left\lfloor \frac{\arg(29-x)}{2 \pi} \right\rfloor\right) \sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k (29-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right) \sum_{k=0}^{\infty} \frac{6^k}{k!} \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$e^{6} \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) = \exp\left(\frac{1}{8} \pi \exp\left(i \pi \left\lfloor \frac{\arg(29-x)}{2 \pi} \right\rfloor\right) \sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k (29-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right) \sum_{k=-\infty}^{\infty} I_k(6) \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

e^6 *exp[Pi*sqrt(225-196) * 1/8] -233-13

Input:

$$e^{6} \exp\left(\pi \sqrt{225-196} \times \frac{1}{8}\right) - 233 - 13$$

Exact result:

$$e^{6+(\sqrt{29}\, \pi)/8} - 246$$

Decimal approximation:

3097.4191988257576225577481087369725329170368808969589323489481356

…

3097.419198825… result very near to the J/Psi meson mass 3096.916

Alternative representations:

$$e^6 \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) - 233 - 13 = z^6 \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) - 233 - 13 \quad \text{for } z = e$$

$$e^6 \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) - 233 - 13 = w^a \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) - 233 - 13 \quad \text{for } a = \frac{6}{\log(w)}$$

$$e^6 \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) - 233 - 13 = -246 + \exp\left(\frac{\pi \sqrt{29}}{8}\right)\left(1 + \frac{2}{-1 + \coth(3)}\right)$$

Series representations:

$$e^6 \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) - 233 - 13 = -246 + \exp\left(\frac{1}{8} \pi \sqrt{28} \sum_{k=0}^{\infty} 28^{-k} \binom{\frac{1}{2}}{k}\right) \sum_{k=-\infty}^{\infty} I_k(6)$$

$$e^6 \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) - 233 - 13 = -246 + \exp\left(\frac{1}{8} \pi \exp\left(i \pi \left\lfloor \frac{\arg(29-x)}{2 \pi} \right\rfloor\right) \sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k (29-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right) \sum_{k=0}^{\infty} \frac{6^k}{k!} \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$e^6 \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) - 233 - 13 = -246 + \exp\left(\frac{1}{8} \pi \exp\left(i \pi \left\lfloor \frac{\arg(29-x)}{2 \pi} \right\rfloor\right) \sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k (29-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right) \sum_{k=-\infty}^{\infty} I_k(6) \text{ for } (x \in \mathbb{R} \text{ and } x < 0)$$

(((e^6 *exp[Pi*sqrt(225-196) * 1/8])))+64*16-276+5

Input:

$$e^6 \exp\left(\pi \sqrt{225-196} \times \frac{1}{8}\right) + 64 \times 16 - 276 + 5$$

Exact result:

$$753 + e^{6+\left(\sqrt{29}\, \pi\right)/8}$$

Decimal approximation:

4096.4191988257576225577481087369725329170368808969589323489481356…

4096.4191988… ≈ 4096

Alternative representations:

$$e^6 \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) + 64 \times 16 - 276 + 5 = z^6 \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) + 64 \times 16 - 276 + 5 \text{ for } z = e$$

$$e^6 \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) + 64 \times 16 - 276 + 5 = w^a \exp\left(\frac{1}{8} \pi \sqrt{225-196}\right) + 64 \times 16 - 276 + 5 \text{ for } a = \frac{6}{\log(w)}$$

$$e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5 = 753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\left(1+\frac{2}{-1+\coth(3)}\right)$$

Series representations:

$$e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5 = 753+\exp\left(\frac{1}{8}\pi\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)\sum_{k=-\infty}^{\infty}I_{k}(6)$$

$$e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5 = 753+\exp\left(\frac{1}{8}\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^{k}(29-x)^{k}x^{-k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)\sum_{k=0}^{\infty}\frac{6^{k}}{k!} \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5 = 753+\exp\left(\frac{1}{8}\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^{k}(29-x)^{k}x^{-k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)\sum_{k=-\infty}^{\infty}I_{k}(6) \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

27*sqrt(((((e^6 *exp[Pi*sqrt(225-196) * 1/8])))+64*16-276+5))+1

Input:

$$27\sqrt{e^{6}\exp\left(\pi\sqrt{225-196}\times\frac{1}{8}\right)+64\times 16-276+5}+1$$

Exact result:

$$1+27\sqrt{753+e^{6+(\sqrt{29}\,\pi)/8}}$$

Decimal approximation:

1729.088422490001646456544021439212426492269960256838769834885992

…

1729.08842249…

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternative representations:

$$27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1=$$
$$27\sqrt{z^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1\ \text{ for } z=e$$

$$27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1=$$
$$27\sqrt{w^a\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1\ \text{ for } a=\frac{6}{\log(w)}$$

$$27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1=$$
$$1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\left(1+\frac{2}{-1+\coth(3)}\right)}$$

Series representations:

$$27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1 = 1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\sum_{k=0}^{\infty}\frac{6^k}{k!}}$$

$$27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1 = 1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\sum_{k=-\infty}^{\infty}I_k(6)}$$

$$27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1 = 1+27\sqrt{752+e^6\exp\left(\frac{\pi\sqrt{29}}{8}\right)}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(752+e^6\exp\left(\frac{\pi\sqrt{29}}{8}\right)\right)^{-k}$$

((27*sqrt(((((e^6 *exp[Pi*sqrt(225-196) * 1/8])))+64*16-276+5))+1))^1/15

Input:

$$\sqrt[15]{27\sqrt{e^6\exp\left(\pi\sqrt{225-196}\times\frac{1}{8}\right)+64\times 16-276+5}+1}$$

Exact result:

$$\sqrt[15]{1+27\sqrt{753+e^{6+(\sqrt{29}\,\pi)/8}}}$$

Decimal approximation:

1.6438208330196690425019679026973391761989124126042024109495767103

...

$1.643820833\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ \ldots$

All 15th roots of 1 + 27 sqrt(753 + e^(6 + (sqrt(29) π)/8)):

$$\sqrt[15]{1+27\sqrt{753+e^{6+(\sqrt{29}\,\pi)/8}}}\;e^{0} \approx 1.64382 \text{ (real, principal root)}$$

$$\sqrt[15]{1+27\sqrt{753+e^{6+(\sqrt{29}\,\pi)/8}}}\;e^{(2 i \pi)/15} \approx 1.5017+0.6686\,i$$

$$\sqrt[15]{1+27\sqrt{753+e^{6+(\sqrt{29}\,\pi)/8}}}\;e^{(4 i \pi)/15} \approx 1.0999+1.2216\,i$$

$$\sqrt[15]{1+27\sqrt{753+e^{6+(\sqrt{29}\,\pi)/8}}}\;e^{(2 i \pi)/5} \approx 0.5080+1.5634\,i$$

$$\sqrt[15]{1+27\sqrt{753+e^{6+(\sqrt{29}\,\pi)/8}}}\;e^{(8 i \pi)/15} \approx -0.17183+1.63482\,i$$

Alternative representations:

$$\sqrt[15]{27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1} = \sqrt[15]{27\sqrt{z^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1} \quad \text{for } z=e$$

$$\sqrt[15]{27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1} = \sqrt[15]{1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\left(1+\frac{2}{-1+\coth(3)}\right)}}$$

$$\sqrt[15]{27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1} = \sqrt[15]{27\sqrt{w^a\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1} \quad \text{for } a=\frac{6}{\log(w)}$$

Series representations:

$$\sqrt[15]{27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times16-276+5}+1} = \sqrt[15]{1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\sum_{k=0}^{\infty}\frac{6^k}{k!}}}$$

$$\sqrt[15]{27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1} = \sqrt[15]{1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\sum_{k=-\infty}^{\infty} I_k(6)}}$$

$$\sqrt[15]{27\sqrt{e^6\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1} = \sqrt[15]{1+27\sqrt{752+e^6\exp\left(\frac{\pi\sqrt{29}}{8}\right)\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(752+e^6\exp\left(\frac{\pi\sqrt{29}}{8}\right)\right)^{-k}}}$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\pi i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\operatorname{Re}(a) \text{ and } |\arg(z)|<\pi)$$

[((27*sqrt(((((e^6 *exp[Pi*sqrt(225-196) * 1/8])))+64*16-276+5))+1))^1/15-1]^1/32

Input:

$$\sqrt[32]{\sqrt[15]{27\sqrt{e^6\exp\left(\pi\sqrt{225-196}\times\frac{1}{8}\right)+64\times 16-276+5}+1}-1}$$

Exact result:

$$\sqrt[32]{\sqrt[15]{1+27\sqrt{753+e^{6+(\sqrt{29}\,\pi)/8}}}-1}$$

Decimal approximation:

0.98633377985945374392036154263722930890428895200254428580787329 52

…

0.9863337798…. result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5 \sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}}\approx 0.9991104684$$

and to the Omega mesons (ω/ω_3 | $5+3$ | $m_{u/d}=255-390$ | $0.988-1.18$) Regge slope value (0.988) connected to the dilaton scalar field **$0.989117352243=\phi$**

A_1^{**} above the two low-lying pseudo-scalars. (bound states of gluons, or 'glueballs')

A_1^{**}	0.943(39) [2.5]	0.988(38)	0.152(53)
A_4	1.03(10) [2.5]	0.999(32)	0.035(21)

(**Glueball Regge trajectories -** *Harvey Byron Meyer*, Lincoln College -Thesis submitted for the degree of Doctor of Philosophy at the University of Oxford Trinity Term, 2004)

Note that

$$\sqrt[32]{\zeta(2)-1}$$

$$\sqrt[32]{\frac{\pi^2}{6}-1}$$

= 0.98638703135648129 15…

All 32nd roots of (1 + 27 sqrt(753 + e^(6 + (sqrt(29) π)/8)))^(1/15) - 1:

$$\sqrt[32]{\sqrt[15]{1+27\sqrt{753+e^{6+\left(\sqrt{29}\ \pi\right)/8}}}-1}\ e^{0}\approx 0.986334 \text{ (real, principal root)}$$

$$\sqrt[32]{\sqrt[15]{1+27\sqrt{753+e^{6+\left(\sqrt{29}\ \pi\right)/8}}}-1}\ e^{(i\pi)/16}\approx 0.96738+0.19242\,i$$

$$\sqrt[32]{\sqrt[15]{1+27\sqrt{753+e^{6+\left(\sqrt{29}\ \pi\right)/8}}}-1}\ e^{(i\pi)/8}\approx 0.91125+0.37745\,i$$

$$\sqrt[32]{\sqrt[15]{1+27\sqrt{753+e^{6+\left(\sqrt{29}\ \pi\right)/8}}}-1}\ e^{(3i\pi)/16}\approx 0.82011+0.5480\,i$$

$$\sqrt[32]{\sqrt[15]{1+27\sqrt{753+e^{6+\left(\sqrt{29}\ \pi\right)/8}}}-1}\ e^{(i\pi)/4}\approx 0.69744+0.69744\,i$$

Alternative representations:

$$\sqrt[32]{\sqrt[15]{27\sqrt{e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1}-1}=$$

$$\sqrt[32]{-1+\sqrt[15]{1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\left(1+\frac{2}{-1+\coth(3)}\right)}}}$$

$$\sqrt[32]{\sqrt[15]{27\sqrt{e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1}-1} =$$
$$\sqrt[32]{\sqrt[15]{27\sqrt{z^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1}-1} \quad \text{for } z=e$$

$$\sqrt[32]{\sqrt[15]{27\sqrt{e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1}-1} =$$
$$\sqrt[32]{-1+\sqrt[15]{1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\left(-1+\frac{2}{1-\tanh(3)}\right)}}}$$

Series representations:

$$\sqrt[32]{\sqrt[15]{27\sqrt{e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1}-1} =$$
$$\sqrt[32]{-1+\sqrt[15]{1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\sum_{k=0}^{\infty}\frac{6^{k}}{k!}}}}$$

$$\sqrt[32]{\sqrt[15]{27\sqrt{e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1}-1} =$$
$$\sqrt[32]{-1+\sqrt[15]{1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\sum_{k=-\infty}^{\infty}I_{k}(6)}}}$$

$$\sqrt[32]{\sqrt[15]{27\sqrt{e^6 \exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)+64\times 16-276+5}+1}-1} =$$

$$\sqrt[32]{-1+\sqrt[15]{1+27\sqrt{753+\exp\left(\frac{\pi\sqrt{29}}{8}\right)\left(I_0(6)+2\sum_{k=1}^{\infty} I_k(6)\right)}}}$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\text{Re}(a) \text{ and } |\arg(z)|<\pi)$$

(((e^6 *exp[Pi*sqrt(225-196) * 1/8])))^1/17

Input:

$$\sqrt[17]{e^6 \exp\left(\pi\sqrt{225-196}\times\frac{1}{8}\right)}$$

Exact result:

$$e^{6/17+\left(\sqrt{29}\,\pi\right)/136}$$

Decimal approximation:

1.6117784434680193340117176760747666614638906670561353241479803961
…

1.61177844…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternate form:

$$e^{1/136\left(48+\sqrt{29}\,\pi\right)}$$

All 17th roots of e^(6 + (sqrt(29) π)/8):

$$e^{6/17+\left(\sqrt{29}\,\pi\right)/136}\,e^{0} \approx 1.6118 \quad \text{(real, principal root)}$$

$e^{6/17+(\sqrt{29}\ \pi)/136}\ e^{(2 i \pi)/17} \approx 1.5029 + 0.5822\, i$

$e^{6/17+(\sqrt{29}\ \pi)/136}\ e^{(4 i \pi)/17} \approx 1.1911 + 1.0858\, i$

$e^{6/17+(\sqrt{29}\ \pi)/136}\ e^{(6 i \pi)/17} \approx 0.7184 + 1.4428\, i$

$e^{6/17+(\sqrt{29}\ \pi)/136}\ e^{(8 i \pi)/17} \approx 0.14872 + 1.6049\, i$

Alternative representations:

$$\sqrt[17]{e^6 \exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)} = \sqrt[17]{z^6 \exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)} \text{ for } z = e$$

$$\sqrt[17]{e^6 \exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)} = \sqrt[17]{w^a \exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)} \text{ for } a = \frac{6}{\log(w)}$$

$$\sqrt[17]{e^6 \exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)} = \sqrt[17]{\exp\left(\frac{\pi\sqrt{29}}{8}\right)\left(1+\frac{2}{-1+\coth(3)}\right)}$$

Series representations:

$$\sqrt[17]{e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)} = \sqrt[17]{\exp\left(\frac{1}{8}\pi\sqrt{28}\sum_{k=0}^{\infty}28^{-k}\binom{\frac{1}{2}}{k}\right)\sum_{k=-\infty}^{\infty}I_k(6)}$$

$$\sqrt[17]{e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)} = \sqrt[17]{\exp\left(\frac{1}{8}\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{6^k}{k!}}$$

for ($x \in \mathbb{R}$ and $x < 0$)

$$\sqrt[17]{e^{6}\exp\left(\frac{1}{8}\pi\sqrt{225-196}\right)} = \sqrt[17]{\exp\left(\frac{1}{8}\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=-\infty}^{\infty}I_k(6)}$$

for ($x \in \mathbb{R}$ and $x < 0$)

Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\Gamma(-a-s)}{z^s}\,ds}{(2\pi i)\Gamma(-a)} \quad \text{for } (0 < \gamma < -\operatorname{Re}(a) \text{ and } |\arg(z)| < \pi)$$

From:

Toroidal compactification and symmetry breaking in open-string theories - *M. Bianchi, G. Pradisi and A. Sagnotti* - Nuclear Physics B 376 (1992) *365—386* North-Holland

We have that:

$R = \sqrt{2}$,
m = 6 ; η(τ) = 1.29927 ; $N = 4$

$$A = \frac{N^2}{2} \frac{\sum_m e^{-(\pi\tau/2)(2m/R)^2}}{\eta(i\tau/2)} . \qquad (2.5)$$

From:

$$A = \frac{N^2}{2} \frac{\sum_m e^{-(\pi\tau/2)(2m/R)^2}}{\eta(i\tau/2)} .$$

((4^2)/2) * (((exp-[(Pi/2)(12/sqrt2)^2]))) / (1.29927*i/2)

Input interpretation:

$$\frac{4^2}{2} \times \frac{\exp\left(-\left(\frac{\pi}{2}\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)}{1.29927 \times \frac{i}{2}}$$

i is the imaginary unit

Result:

-0
$9.39446\ldots \times 10^{-49}\, i$

Polar coordinates:

$r = 9.39446 \times 10^{-49}$ (radius), $\theta = -90°$ (angle)

$9.39446 * 10^{-49}$

Series representations:

$$\frac{\exp\left(-\frac{1}{2}\left(\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)4^2}{\frac{1}{2}(1.29927\,i)\,2} = \frac{12.3146\exp\left(-\frac{72\pi}{\sqrt{z_0}^{\,2}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)^2}\right)}{i}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

$$\frac{\exp\left(-\frac{1}{2}\left(\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)4^2}{\frac{1}{2}(1.29927\,i)\,2} =$$

$$\frac{12.3146\exp\left(-\frac{72\pi}{\exp^2\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}^{\,2}\left(\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2}\right)}{i}$$

for ($x \in \mathbb{R}$ and $x < 0$)

$$\frac{\exp\left(-\frac{1}{2}\left(\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)4^2}{\frac{1}{2}(1.29927\,i)\,2} = \frac{12.3146\exp\left(-\frac{72\pi\left(\frac{1}{z_0}\right)^{-\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{-1-\lfloor\arg(2-z_0)/(2\pi)\rfloor}}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)^2}\right)}{i}$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\arg(z)$ is the complex argument

$\lfloor x \rfloor$ is the floor function

1/(2Pi) * ln((((4^2)/2) * (((exp-[(Pi/2)(12/sqrt2)^2]))) / (1.29927*i/2)))

Input interpretation:

$$\frac{1}{2\pi}\log\left(\frac{4^2}{2}\times\frac{\exp\left(-\left(\frac{\pi}{2}\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)}{1.29927\times\frac{i}{2}}\right)$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

$-17.600396\ldots -$
$0.25\,i$

Polar coordinates:

$r = 17.6022$ (radius), $\theta = -179.186°$ (angle)

17.6022 result very near to the black hole entropy ln(42987519) = 17.5764

Alternative representations:

$$\frac{\log\left(\frac{4^2\exp\left(-\frac{1}{2}\left(\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)}{\frac{2\,(1.29927\,i)}{2}}\right)}{2\pi}=\frac{\log_e\left(\frac{\exp\left(-\frac{1}{2}\,\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)4^2}{2\,(0.649635\,i)}\right)}{2\pi}$$

$$\frac{\log\left(\frac{4^2\exp\left(-\frac{1}{2}\left(\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)}{\frac{2\,(1.29927\,i)}{2}}\right)}{2\pi}=\frac{\log(a)\log_a\left(\frac{\exp\left(-\frac{1}{2}\,\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)4^2}{2\,(0.649635\,i)}\right)}{2\pi}$$

Integral representation:

$$\frac{\log\left(\frac{4^2\exp\left(-\frac{1}{2}\left(\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)}{\frac{2\,(1.29927\,i)}{2}}\right)}{2\pi}=\frac{1}{2\pi}\int_1^{\frac{12.3146\exp\left(-\frac{72\,\pi}{\sqrt{2}^{2}}\right)}{i}}\frac{1}{t}\,dt$$

From which:

29*1/(((1/(2Pi) * ln((((4^2)/2) * (((exp-[(Pi/2)(12/sqrt2)^2])) / (1.29927*i/2))))))

Input interpretation:

$$29\times\frac{1}{\frac{1}{2\pi}\log\left(\frac{4^2}{2}\times\frac{\exp\left(-\left(\frac{\pi}{2}\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)}{1.29927\times\frac{i}{2}}\right)}$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

$-1.6473578\ldots +$
$0.023399443\ldots\, i$

Polar coordinates:

$r = 1.64752$ (radius), $\theta = 179.186°$ (angle)

$1.64752 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Alternative representations:

$$\frac{29}{\frac{\log\left(\frac{4^2\exp\left(-\frac{1}{2}\left(\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)}{\frac{2\,(1.29927\,i)}{2}}\right)}{2\pi}} = \frac{29}{\frac{\log_e\left(\frac{\exp\left(-\frac{1}{2}\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)4^2}{2\,(0.649635\,i)}\right)}{2\pi}}$$

$$\frac{29}{\frac{\log\left(\frac{4^2\exp\left(-\frac{1}{2}\left(\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)}{\frac{2\,(1.29927\,i)}{2}}\right)}{2\pi}} = \frac{29}{\frac{\log(a)\log_a\left(\frac{\exp\left(-\frac{1}{2}\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)4^2}{2\,(0.649635\,i)}\right)}{2\pi}}$$

Integral representation:

$$\frac{29}{\frac{\log\left(\frac{4^2 \exp\left(-\frac{1}{2}\left(\pi\left(\frac{12}{\sqrt{2}}\right)^2\right)\right)}{\frac{2\,(1.29927\,i)}{2}}\right)}{2\pi}} = \frac{58\,\pi}{\int_1^{\frac{12.3146\exp\left(-\frac{72\,\pi}{\sqrt{2}^{\,2}}\right)}{i}} \frac{1}{t}\,dt}$$

(1/(1.29927*i/2)) ((4^2)/2) * sum(((exp-[(Pi/2)((2x)/sqrt2)^2])), x = 0..infinity

Input interpretation:

$$\frac{1}{1.29927\times\frac{i}{2}}\times\frac{4^2}{2}\sum_{x=0}^{\infty}\exp\left(-\left(\frac{\pi}{2}\left(\frac{2\,x}{\sqrt{2}}\right)^2\right)\right)$$

i is the imaginary unit

Result:

$-12.8468\,i$

-12.8468i = A

21* 1/ ((((1/(1.29927*i/2)) ((4^2)/2) * sum(((exp-[(Pi/2)((2x)/sqrt2)^2])), x = 0..infinity)))

Input interpretation:

$$21\times\frac{1}{\frac{1}{1.29927\times\frac{i}{2}}\times\frac{4^2}{2}\sum_{x=0}^{\infty}\exp\left(-\left(\frac{\pi}{2}\left(\frac{2\,x}{\sqrt{2}}\right)^2\right)\right)}$$

i is the imaginary unit

Result:

$1.63465\,i$

$1.63465i \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$ with imaginary unit

From:

$$\widetilde{A} = \frac{RN^2}{4} 2^{-D/2} \frac{\sum\limits_n e^{-\pi\tau n^2 R^2/4}}{\eta(i\tau)},$$

For

$R = \sqrt{2}$,

m = 6 ; $\eta(\tau) = 1.29927$; $N = 4$; D = 4, we obtain:

(16*sqrt2)/4 * 2^(-2) * (((exp-[(36Pi*2)]/4))) (1/(1.29927*i))

Input interpretation:

$$\frac{\left(\frac{1}{4}\left(16\sqrt{2}\right)\right)\left(\frac{1}{4}\exp(-(36\pi\times 2))\right)\times\frac{1}{1.29927\,i}}{2^2}$$

i is the imaginary unit

Result:

-0

$1.58365\ldots \times 10^{-99}\, i$

Polar coordinates:

$r = 1.58365\times 10^{-99}$ (radius), $\theta = -90°$ (angle)

$1.58365*10^{-99}$

Series representations:

$$\frac{\exp(-(36\pi\,2))\,16\sqrt{2}}{2^2\times 4\times 4\,(1.29927\,i)} = \frac{0.192416\exp(-72\pi)\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}{i}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

$$\frac{\exp(-(36\,\pi\,2))\,16\,\sqrt{2}}{2^2\times 4\times 4\,(1.29927\,i)} = \frac{0.192416\exp(-72\,\pi)\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(2-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k\,(2-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{i}$$

for ($x \in \mathbb{R}$ and $x < 0$)

$$\frac{\exp(-(36\,\pi\,2))\,16\,\sqrt{2}}{2^2\times 4\times 4\,(1.29927\,i)} = \frac{1}{i}\,0.192416\exp(-72\,\pi)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\,\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\,\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k\,z_0^{-k}}{k!}$$

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

ln((((16*sqrt2)/4 * 2^(-2) * (((exp-[(36Pi*2)]/4))) (1/(1.29927*i)))))

Input interpretation:

$$\log\left(\frac{\left(\frac{1}{4}\left(16\sqrt{2}\right)\right)\left(\frac{1}{4}\exp(-(36\,\pi\times 2))\right)\times\frac{1}{1.29927\,i}}{2^2}\right)$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

Result:

$-227.49619\ldots -$
$1.5707963\ldots\,i$

Polar coordinates:

$r = 227.502$ (radius), $\theta = -179.604°$ (angle)

227.502 result very near to the value of Planck multipole spectrum data 226.13

Alternative representations:

$$\log\left(\frac{\exp(-(36\pi 2))\, 16\sqrt{2}}{2^2 \times 4 \times 4\, (1.29927\, i)}\right) = \log_e\left(\frac{4\exp(-72\pi)\left(\frac{1}{4}\right)^2 \sqrt{2}}{1.29927\, i}\right)$$

$$\log\left(\frac{\exp(-(36\pi 2))\, 16\sqrt{2}}{2^2 \times 4 \times 4\, (1.29927\, i)}\right) = \log(a)\log_a\left(\frac{4\exp(-72\pi)\left(\frac{1}{4}\right)^2 \sqrt{2}}{1.29927\, i}\right)$$

Integral representation:

$$\log\left(\frac{\exp(-(36\pi 2))\, 16\sqrt{2}}{2^2 \times 4 \times 4\, (1.29927\, i)}\right) = \int_1^{\frac{0.192416\exp(-72\pi)\sqrt{2}}{i}} \frac{1}{t}\, dt$$

(55+5)/ (((1/(2Pi) * ln((((16*sqrt2)/4 * 2^(-2) * (((exp-[(36Pi*2)]/4))) (1/(1.29927*i))))))))

Input interpretation:

$$\frac{55+5}{\frac{1}{2\pi}\log\left(\frac{\left(\frac{1}{4}\left(16\sqrt{2}\right)\right)\left(\frac{1}{4}\exp(-(36\pi\times 2))\right)\times\frac{1}{1.29927\, i}}{2^2}\right)}$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

Result:

$-1.6570525\ldots +$
$0.011441475\ldots\, i$

Polar coordinates:

$r = 1.65709$ (radius), $\theta = 179.604°$ (angle)

1.65709 result very near to the 14th root of the following Ramanujan’s class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Alternative representations:

$$\frac{55+5}{\frac{\log\left(\frac{\left(16\sqrt{2}\right)\exp(-(36\pi 2))}{2^2\times 4\times 4\,(1.29927\,i)}\right)}{2\pi}} = \frac{60}{\frac{\log_e\left(\frac{4\exp(-72\pi)\left(\frac{1}{4}\right)^2\sqrt{2}}{1.29927\,i}\right)}{2\pi}}$$

$$\frac{55+5}{\frac{\log\left(\frac{\left(16\sqrt{2}\right)\exp(-(36\pi 2))}{2^2\times 4\times 4\,(1.29927\,i)}\right)}{2\pi}} = \frac{60}{\frac{\log(a)\log_a\left(\frac{4\exp(-72\pi)\left(\frac{1}{4}\right)^2\sqrt{2}}{1.29927\,i}\right)}{2\pi}}$$

Integral representation:

$$\frac{55+5}{\frac{\log\left(\frac{\left(16\sqrt{2}\right)\exp(-(36\pi 2))}{2^2\times 4\times 4\,(1.29927\,i)}\right)}{2\pi}} = \frac{120\pi}{\int_1^{\frac{0.192416\exp(-72\pi)\sqrt{2}}{i}}\frac{1}{t}\,dt}$$

(1/(1.29927*i)) (16*sqrt2)/4 * 1/4 * sum(((exp-[(Pi*(x)^2*2)]/4))), x = 0..infinity

Input interpretation:

$$\frac{1}{1.29927\,i}\left(\frac{1}{4}\left(16\sqrt{2}\right)\right)\times\frac{1}{4}\sum_{x=0}^{\infty}\frac{1}{4}\exp\left(-\left(\pi x^2\times 2\right)\right)$$

i is the imaginary unit

Result:

$-0.272625\,i$

$-0.272625i = \tilde{A}$

-6*((((1/(1.29927*i)) (16*sqrt2)/4 * 1/4 * sum(((exp-[(Pi*(x)^2*2)]/4))), x = 0..infinity)))

Input interpretation:

$$-6\left(\frac{1}{1.29927\,i}\left(\frac{1}{4}\left(16\sqrt{2}\right)\right)\times\frac{1}{4}\sum_{x=0}^{\infty}\frac{1}{4}\exp\left(-\left(\pi x^2\times 2\right)\right)\right)$$

i is the imaginary unit

Result:

$1.63575\,i$

1.63575i result very near to the mean between $\zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$ and the value of golden ratio 1.61803398…, i.e. 1.63148399 with imaginary unit

From the difference between the two analyzed expressions, we obtain:

(((1/(1.29927*i/2)) ((4^2)/2) * sum(((exp-[(Pi/2)((2x)/sqrt2)^2]))), x = 0..infinity))-(((1/(1.29927*i)) (16*sqrt2)/4 * 1/4 * sum(((exp-[(Pi*(x)^2*2)]/4))), x = 0..infinity))

Input interpretation:

$$\frac{1}{1.29927\times\frac{i}{2}}\times\frac{4^2}{2}\sum_{x=0}^{\infty}\exp\left(-\left(\frac{\pi}{2}\left(\frac{2x}{\sqrt{2}}\right)^2\right)\right)-\frac{1}{1.29927\,i}\left(\frac{1}{4}\left(16\sqrt{2}\right)\right)\times\frac{1}{4}\sum_{x=0}^{\infty}\frac{1}{4}\exp\left(-\left(\pi x^2\times 2\right)\right)$$

i is the imaginary unit

Result:

$-12.5742\,i$

-12.5742i result very near to the S_{BH} black hole entropy 12.5664 = 4π with imaginary unit and minus sign

For:

$$2N + M + \overline{M} = 32,$$

N = 4; M = 8; $\bar{M}$ = 16 → 2 * 4 + 8 + 16 = 32

From:

$$\begin{aligned} A = \Bigg\{ & \left[\frac{(2N)^2}{2} + M\overline{M} \right] \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R)^2} \\ & + (2N)M \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R+A)^2} + (2N)\overline{M} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R-A)^2} \\ & + \frac{M^2}{2} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R+2A)^2} + \frac{\overline{M}^2}{2} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R-2A)^2} \Bigg\} \Big/ \eta\left(\frac{i\tau}{2}\right), \end{aligned} \qquad (2.12)$$

$$\begin{aligned} \boldsymbol{M} = -\Bigg\{ & \frac{2N}{2} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R)^2} + \frac{M}{2} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R+2A)^2} \\ & + \frac{\overline{M}}{2} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R-2A)^2} \Bigg\} \Big/ \hat{\eta}\left(\frac{i\tau}{2} + \frac{1}{2}\right), \end{aligned} \qquad (2.13)$$

$$M = -\left\{ \frac{2N}{2} \sum_{m} \mathrm{e}^{-(\pi\tau/2)(2m/R)^2} + \frac{M}{2} \sum_{m} \mathrm{e}^{-(\pi\tau/2)(2m/R+2A)^2} + \frac{\overline{M}}{2} \sum_{m} \mathrm{e}^{-(\pi\tau/2)(2m/R-2A)^2} \right\} \Big/ \hat{\eta}\left(\frac{i\tau}{2} + \frac{1}{2}\right),$$

A = -12.8468i

sum e^-[(Pi/2)*((2x)/(sqrt2))^2], x = 0..infinity

Infinite sum:

$$\sum_{x=0}^{\infty} e^{-1/2\left(\pi\left((2x)/\sqrt{2}\right)^2\right)} = \frac{1}{2}\left(1 + \vartheta_3(0, e^{-\pi})\right) \approx 1.0432$$

1.0432

sum e^-[(Pi/2)*((2x)/((((sqrt2)+2*(12.8468)))))^2], x = 0..infinity

Infinite sum:

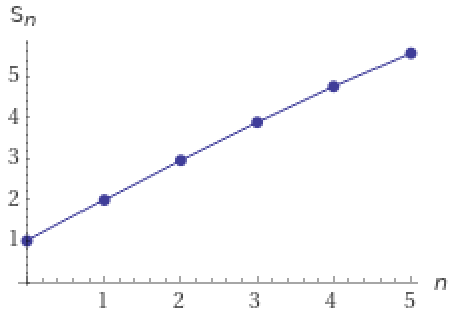
$$\sum_{x=0}^{\infty} e^{-\frac{1}{2}\left(\pi\left(\frac{2x}{\sqrt{2}+2\times 12.8468}\right)^2\right)} = 10.0841$$

10.0841

Sum convergence:

$$\sum_{x=0}^{\infty} e^{-\frac{1}{2}\left(\pi\left(\frac{2x}{\sqrt{2}+2\times 12.8468}\right)^2\right)} \text{ converges}$$

Partial sums:



sum e^-[(Pi/2)*((2x)/(sqrt2)-2*(12.8468))^2], x = 0..infinity

Infinite sum:

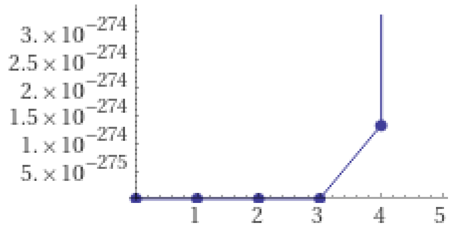
$$\sum_{x=0}^{\infty} e^{-1/2\left(\pi\left((2\,x)/\sqrt{2}-2\times 12.8468\right)^2\right)} = 1.04253$$

1.04253

Sum convergence:

$$\sum_{x=0}^{\infty} e^{-1/2\left(\pi\left((2\,x)/\sqrt{2}-2\times 12.8468\right)^2\right)} \text{ converges}$$

Partial sums:



From:

$$M = -\left\{ \frac{2N}{2} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R)^2} + \frac{M}{2} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R+2A)^2} + \frac{\overline{M}}{2} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R-2A)^2} \right\} / \hat{\eta}\left(\frac{i\tau}{2} + \frac{1}{2}\right),$$

-(4*1.0432+4*(10.0841)+8*(1.0432))*1/(1.29927*(i/2+1/2))

Input interpretation:

$$-(4\times 1.0432 + 4\times 10.0841 + 8\times 1.0432)\times \frac{1}{1.29927\left(\frac{i}{2}+\frac{1}{2}\right)}$$

i is the imaginary unit

Result:

$-40.6804\ldots +$
$40.6804\ldots\, i$

Polar coordinates:

$r = 57.5307$ (radius), $\theta = 135°$ (angle)

57.5307

$$A = \left\{ \left[\frac{(2N)^2}{2} + M\overline{M} \right] \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R)^2} + (2N)M \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R+A)^2} + (2N)\overline{M} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R-A)^2} + \frac{M^2}{2} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R+2A)^2} + \frac{\overline{M}^2}{2} \sum_m \mathrm{e}^{-(\pi\tau/2)(2m/R-2A)^2} \right\} / \eta\left(\frac{i\tau}{2}\right)$$

sum e^-[(Pi/2)*((2x)/(sqrt2))^2], x = 0..infinity = 1.0432 sum e^-[(Pi/2)*((2x)/((((sqrt2)+(12.8468)))))^2], x = 0..infinity

Infinite sum:

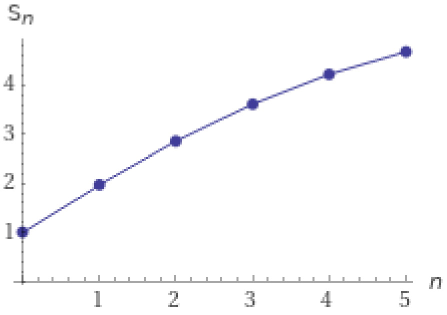
$$\sum_{x=0}^{\infty} e^{-1/2\left(\pi\left((2\,x)/\left(\sqrt{2}+12.8468\right)\right)^2\right)} = 5.54203$$

5.54203

Sum convergence:

$$\sum_{x=0}^{\infty} e^{-1/2\left(\pi\left((2\,x)/\left(\sqrt{2}+12.8468\right)\right)^2\right)} \text{ converges}$$

Partial sums:



sum e^-[(Pi/2)*((2x)/((((sqrt2)-(12.8468)))))^2], x = 0..infinity

Infinite sum:

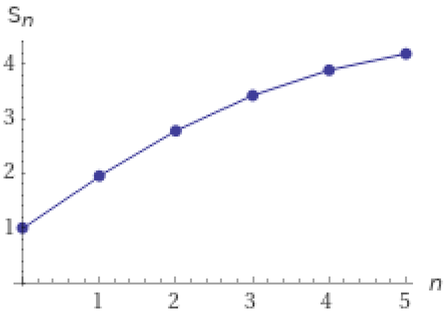
$$\sum_{x=0}^{\infty} e^{-1/2\left(\pi\left((2\,x)/\left(\sqrt{2}-12.8468\right)\right)^2\right)} = 4.54203$$

4.54203

Sum convergence:

$$\sum_{x=0}^{\infty} e^{-1/2\left(\pi\left((2\,x)/\left(\sqrt{2}-12.8468\right)\right)^2\right)} \text{ converges}$$

Partial sums:



sum e^-[(Pi/2)*((2x)/((((sqrt2)+2*(12.8468)))))^2], x = 0..infinity = 10.0841

sum e^-[(Pi/2)*((2x)/((((sqrt2)-2*(12.8468)))))^2], x = 0..infinity = 1.04253

whence:

$$A = \left\{ \left[\frac{(2N)^2}{2} + M\bar{M} \right] \sum_m e^{-(\pi\tau/2)(2m/R)^2} + (2N)M \sum_m e^{-(\pi\tau/2)(2m/R+A)^2} + (2N)\bar{M} \sum_m e^{-(\pi\tau/2)(2m/R-A)^2} + \frac{M^2}{2} \sum_m e^{-(\pi\tau/2)(2m/R+2A)^2} + \frac{\bar{M}^2}{2} \sum_m e^{-(\pi\tau/2)(2m/R-2A)^2} \right\} \Big/ \eta\left(\frac{i\tau}{2}\right)$$

((64/2+8*16)*1.0432+8*8*5.54203+8*16*4.54203+64/2*10.0841+256/2*1.04253)) *1/(1.29927*i/2)

Input interpretation:

$$\left(\left(\frac{64}{2} + 8\times 16\right)\times 1.0432 + 8\times 8\times 5.54203 + 8\times 16\times 4.54203 + \frac{64}{2}\times 10.0841 + \frac{256}{2}\times 1.04253\right)\times \frac{1}{1.29927\times \frac{i}{2}}$$

i is the imaginary unit

Result:

-0
$2399.99\ldots\, i$

Polar coordinates:

$r = 2399.99$ (radius), $\theta = -90°$ (angle)

2399.99

Dividing the two previous expressions, we obtain:

((((64/2+8*16)*1.0432+8*8*5.54203+8*16*4.54203+64/2*10.0841+256/2*1.04253) *1/(1.29927*i/2))) / (((-(4*1.0432+4*(10.0841)+8*(1.0432))*1/(1.29927*(i/2+1/2)))))

Input interpretation:

$$-\left(\left(\left(\left(\frac{64}{2}+8\times 16\right)\times 1.0432+8\times 8\times 5.54203+8\times 16\times 4.54203+\frac{64}{2}\times 10.0841+\frac{256}{2}\times 1.04253\right)\times \frac{1}{1.29927\times \frac{i}{2}}\right)/\left((4\times 1.0432+4\times 10.0841+8\times 1.0432)\times \frac{1}{1.29927\left(\frac{i}{2}+\frac{1}{2}\right)}\right)\right)$$

i is the imaginary unit

Result:

$-29.4981\ldots +$
$29.4981\ldots i$

Polar coordinates:

$r = 41.7166$ (radius), $\theta = 135°$ (angle)

41.7166

Summing, after some calculations:

((((((64/2+8*16)*1.0432+8*8*5.54203+8*16*4.54203+64/2*10.0841+256/2*1.04253)*1/(1.29927*i/2))) + (((-(4*1.0432+4*(10.0841)+8*(1.0432))*1/(1.29927*(i/2+1/2)))))))-1729i-8i

Input interpretation:

$$\left(\left(\left(\left(\frac{64}{2}+8\times16\right)\times1.0432+8\times8\times5.54203+8\times16\times4.54203+\frac{64}{2}\times10.0841+\frac{256}{2}\times1.04253\right)\times\frac{1}{1.29927\times\frac{i}{2}}-(4\times1.0432+4\times10.0841+8\times1.0432)\times\frac{1}{1.29927\left(\frac{i}{2}+\frac{1}{2}\right)}\right)-1729\,i-8\,i\right)$$

i is the imaginary unit

Result:

$-40.6804\ldots-4096.31\ldots\,i$

Polar coordinates:

$r = 4096.51$ (radius), $\theta = -90.569°$ (angle)

$4096.51 \approx 4096$

((27sqrt[((((((64/2+8*16)*1.0432+8*8*5.54203+8*16*4.54203+64/2*10.0841+256/2*1.04253)*1/(1.29927*i/2))) + (((-(4*1.0432+4*(10.0841)+8*(1.0432))*1/(1.29927*(i/2+1/2))))))-1729i-8i]))^1/15

Input interpretation:

$$\left(27\sqrt{\left(\left(\left(\left(\frac{64}{2}+8\times16\right)\times1.0432+8\times8\times5.54203+8\times16\times4.54203+\frac{64}{2}\times10.0841+\frac{256}{2}\times1.04253\right)\times\frac{1}{1.29927\times\frac{i}{2}}-(4\times1.0432+4\times10.0841+8\times1.0432)\times\frac{1}{1.29927\left(\frac{i}{2}+\frac{1}{2}\right)}\right)-1729\,i-8\,i\right)}\right)\hat{}\,(1/15)$$

i is the imaginary unit

Result:

$1.641477\ldots-0.08657105\ldots\,i$

Polar coordinates:

$r = 1.64376$ (radius), $\theta = -3.01897°$ (angle)

$1.64376 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Multiplying the two previous expression and performing the 3th root, we obtain:

[((((64/2+8*16)*1.0432+8*8*5.54203+8*16*4.54203+64/2*10.0841+256/2*1.04253)*1/(1.29927*i/2))) * (((-(4*1.0432+4*(10.0841)+8*(1.0432))*1/(1.29927*(i/2+1/2)))))]^1/3

Input interpretation:

$$\left(\left(\left(\left(\frac{64}{2}+8\times16\right)\times1.0432+8\times8\times5.54203+8\times16\times4.54203+\frac{64}{2}\times10.0841+\frac{256}{2}\times1.04253\right)\times\frac{1}{1.29927\times\frac{i}{2}}\right)\left(-(4\times1.0432+4\times10.0841+8\times1.0432)\times\frac{1}{1.29927\left(\frac{i}{2}+\frac{1}{2}\right)}\right)\right)\text{^}(1/3)$$

i is the imaginary unit

Result:

$49.9245\ldots +$
$13.3772\ldots\, i$

Polar coordinates:

$r = 51.6856$ (radius), $\theta = 15°$ (angle)

51.6856

From the algebraic sum of the two results highlighted in red, we obtain:

(([((((64/2+8*16)*1.0432+8*8*5.54203+8*16*4.54203+64/2*10.0841+256/2*1.04253)*1/(1.29927*i/2))) * (((-(4*1.0432+4*(10.0841)+8*(1.0432))*1/(1.29927*(i/2+1/2)))))]^1/3))-41.7166

Input interpretation:

$$\left(\left(\left(\left(\frac{64}{2}+8\times16\right)\times1.0432+8\times8\times5.54203+8\times16\times4.54203+\frac{64}{2}\times10.0841+\frac{256}{2}\times1.04253\right)\times\frac{1}{1.29927\times\frac{i}{2}}\right)\left(-(4\times1.0432+4\times10.0841+8\times1.0432)\times\frac{1}{1.29927\left(\frac{i}{2}+\frac{1}{2}\right)}\right)\right)\text{^}(1/3)-41.7166$$

i is the imaginary unit

Result:

$8.20788\ldots +$
$13.3772\ldots\, i$

Polar coordinates:

$r = 15.6946$ (radius), $\theta = 58.4679°$ (angle)

15.6946 result very near to the S_{BH} black hole entropy 15.6730

And again, dividing, after some calculations:

1/[1/2(((([((((64/2+8*16)*1.0432+8*8*5.54203+8*16*4.54203+64/2*10.0841+256/2*1.04253)*1/(1.29927*i/2))) * (((-(4*1.0432+4*(10.0841)+8*(1.0432))*1/(1.29927*(i/2+1/2)))))]^1/3))/41.7166))]

Input interpretation:

$$1\Bigg/\left(\frac{1}{2}\times\frac{1}{41.7166}\left(\left(\left(\left(\left(\left(\frac{64}{2}+8\times16\right)\times1.0432+8\times8\times5.54203+8\times16\times4.54203+\frac{64}{2}\times10.0841+\frac{256}{2}\times1.04253\right)\times\frac{1}{1.29927\times\frac{i}{2}}\right)\left(-(4\times1.0432+4\times10.0841+8\times1.0432)\times\frac{1}{1.29927\left(\frac{i}{2}+\frac{1}{2}\right)}\right)\right)\right)\text{^}(1/3)\right)\right)$$

i is the imaginary unit

Result:

$1.55924\ldots -$
$0.417797\ldots\, i$

Polar coordinates:

$r = 1.61424$ (radius), $\theta = -15.°$ (angle)

1.61424 result that is a very good approximation to the value of the golden ratio 1.618033988749...

From the sum between the two previous expressions, we obtain:

[((((64/2+8*16)*1.0432+8*8*5.54203+8*16*4.54203+64/2*10.0841+256/2*1.04253)*1/(1.29927*i/2))) + (((-(4*1.0432+4*(10.0841)+8*(1.0432))*1/(1.29927*(i/2+1/2)))))]

Input interpretation:

$$\left(\left(\frac{64}{2}+8\times 16\right)\times 1.0432+8\times 8\times 5.54203+8\times 16\times 4.54203+\frac{64}{2}\times 10.0841+\frac{256}{2}\times 1.04253\right)\times\frac{1}{1.29927\times\frac{i}{2}}-(4\times 1.0432+4\times 10.0841+8\times 1.0432)\times\frac{1}{1.29927\left(\frac{i}{2}+\frac{1}{2}\right)}$$

i is the imaginary unit

Result:

$$-40.6804\ldots-2359.31\ldots\, i$$

Polar coordinates:

$r = 2359.66$ (radius), $\theta = -90.9878°$ (angle)

2359.66

From which:

((1/2[((((64/2+8*16)*1.0432+8*8*5.54203+8*16*4.54203+64/2*10.0841+256/2*1.04253)*1/(1.29927*i/2))) + (((-(4*1.0432+4*(10.0841)+8*(1.0432))*1/(1.29927*(i/2+1/2)))))]+16i))^1/14

Input interpretation:

$$\left(\frac{1}{2}\left(\left(\left(\frac{64}{2}+8\times 16\right)\times 1.0432+8\times 8\times 5.54203+8\times 16\times 4.54203+\frac{64}{2}\times 10.0841+\frac{256}{2}\times 1.04253\right)\times\frac{1}{1.29927\times\frac{i}{2}}-(4\times 1.0432+4\times 10.0841+8\times 1.0432)\times\frac{1}{1.29927\left(\frac{i}{2}+\frac{1}{2}\right)}\right)+16\, i\right)\text{^}(1/14)$$

i is the imaginary unit

Result:

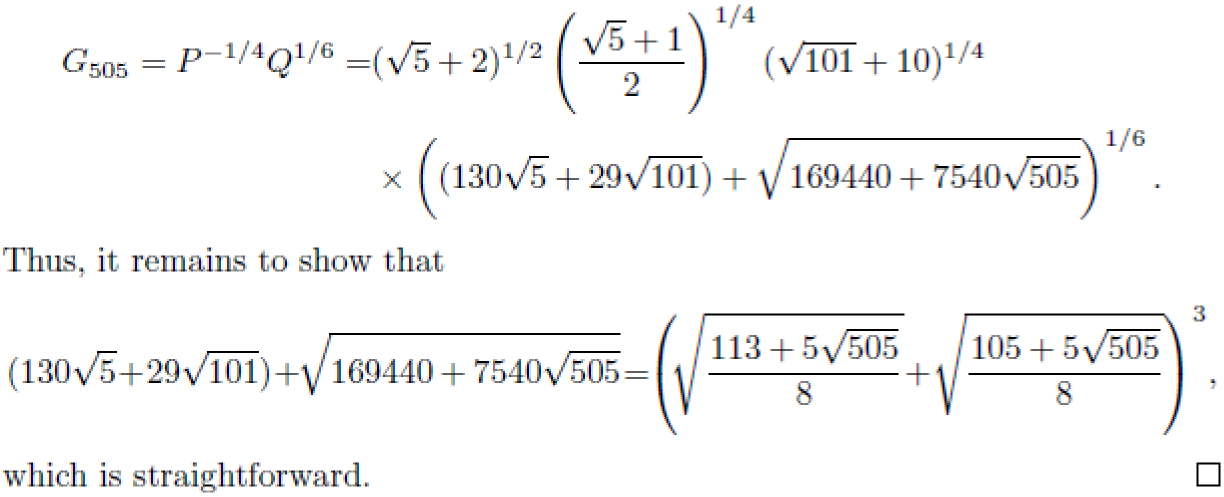
1.645096… −
0.1874380… i

Polar coordinates:

$r = 1.65574$ (radius), $\theta = -6.5001°$ (angle)

1.65574 result that is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Indeed, from:



$$G_{505} = P^{-1/4}Q^{1/6} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4} \times \left((130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}\right)^{1/6}.$$

Thus, it remains to show that

$$(130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}} = \left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3,$$

which is straightforward. ☐

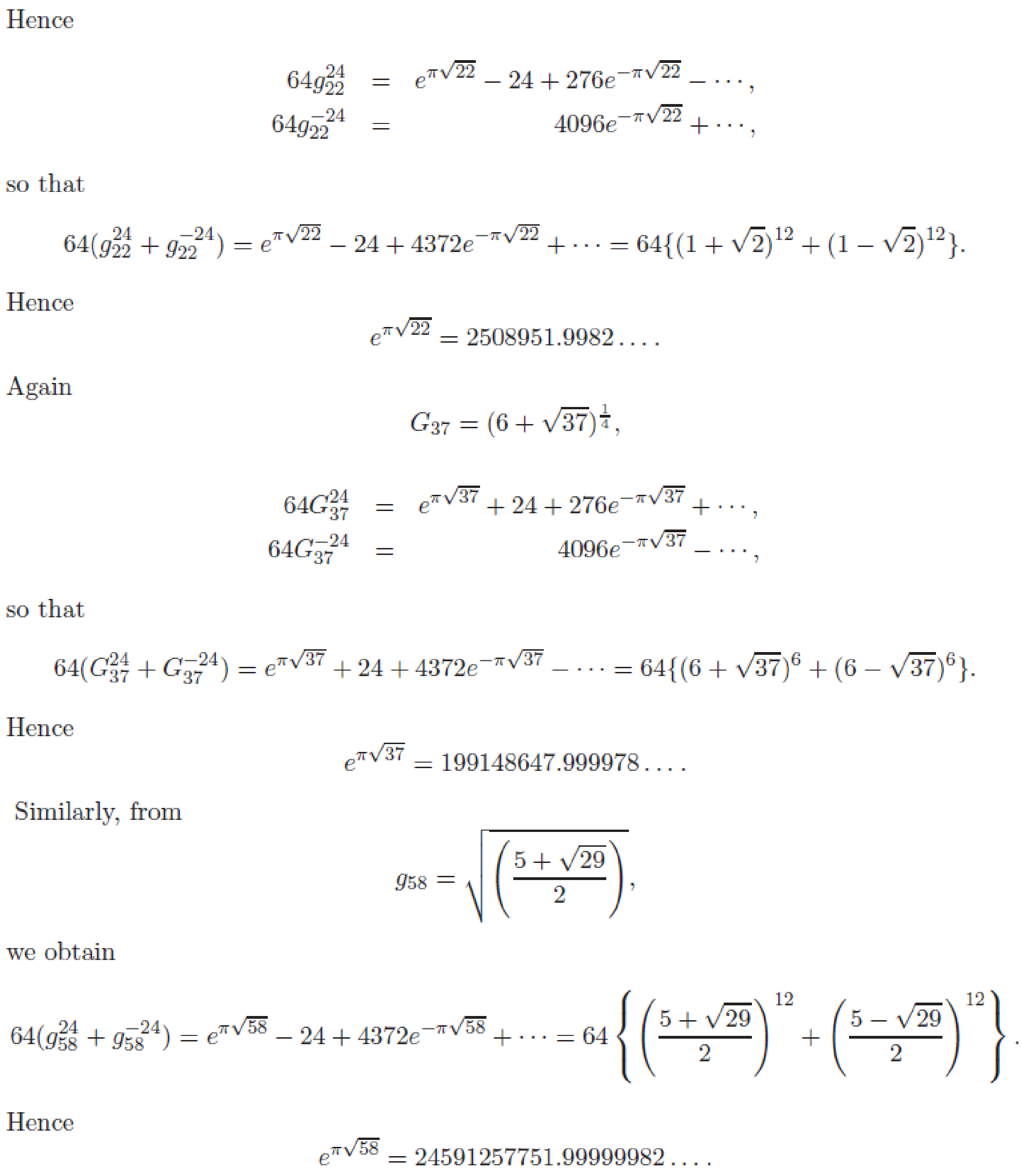
$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\,...$$

Mathematical connections with some sectors of String Theory

From:

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:



Hence

$$\begin{aligned} 64g_{22}^{24} &= e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots, \\ 64g_{22}^{-24} &= 4096e^{-\pi\sqrt{22}} + \cdots, \end{aligned}$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots, \\ 64G_{37}^{-24} &= 4096e^{-\pi\sqrt{37}} - \cdots, \end{aligned}$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^{6} + (6-\sqrt{37})^{6}\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

From:

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E\, \phi} \;=\; -\,\frac{\beta_E^{(p)}\, h^2}{\gamma_E}\; e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

$$16\, k'\, e^{\,-\,2\,C} \;=\; \frac{h^2\left(p\,+\,1\,-\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}}{(7\,-\,p)}$$

$$(A')^2 \;=\; k\, e^{\,-\,2\,A} \;+\; \frac{h^2}{16(p\,+\,1)}\left(7\,-\,p\,+\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096 e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan’s exponential has a coefficient of 4096 which is equal to 642, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18)) we obtain:

Input:

$$\exp\left(-\pi\sqrt{18}\right)$$

Exact result:

$$e^{-3\sqrt{2}\,\pi}$$

Decimal approximation:

$$1.6272016226072509292942156739117979541838581136954016\ldots \times 10^{-6}$$

$1.6272016\ldots * 10^{-6}$

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$$e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10\text{^-}6$$

from which:

$$\frac{1}{4096} e^{-6C+\phi} = 1.6272016\ldots * 10\text{^-}6$$

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10\text{^-}6$$

Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

And:

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

Thence:

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}}$$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625} e^{-6C+\phi} = \frac{1}{0.000244140625} e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi} = 0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625}$$

Result:

$$0.00666501785\ldots$$

0.00666501785…

Series representations:

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141} = 4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}17^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141} = 4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141} = 4096\exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now:

$$e^{-6C+\phi} = 0.0066650177536$$

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

$$= 0.00666501785\ldots$$

From:

ln(0.00666501784619)

Input interpretation:

$\log(0.00666501784619)$

Result:

$-5.010882647757\ldots$

-5.010882647757…

Alternative representations:

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

$$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

$$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$$

Series representations:

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty}\frac{(-1)^k\,(-0.993334982153810000)^k}{k}$$

$$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2 \pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2 \pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.006665017846190000) = \int_1^{0.006665017846190000} \frac{1}{t} \, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757 \ldots$$

and for C = 1, we obtain:

$$\phi = -5.010882647757 + 6 = \mathbf{0.989117352243} = \boldsymbol{\phi}$$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.987428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}} - \varphi + 1} = 1 - \cfrac{e^{-\pi}}{1 + \cfrac{e^{-2\pi}}{1 + \cfrac{e^{-3\pi}}{1 + \cfrac{e^{-4\pi}}{1 + \ldots}}}} \approx 0.9568666373$$

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

(http://www.bitman.name/math/article/102/109/)

The mean between the two results of the above Rogers-Ramanujan continued fractions is 0.97798855285, value very near to the ψ Regge slope 0.979:

Ψ	3	$m_c = 1500$	0.979	−0.09

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.990400732708644027550973755713301415460732796178555551684...

0.99040073.... result very near to the dilaton value $\mathbf{0.989117352243 = \phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

From

AdS Vacua from Dilaton Tadpoles and Form Fluxes - *J. Mourad and A. Sagnotti* - arXiv:1612.08566v2 [hep-th] 22 Feb 2017 - March 27, 2018

We have:

$$\begin{aligned} e^{2C} &= \frac{2\,\xi\,e^{\frac{\phi}{2}}}{1\,\pm\,\sqrt{1\,-\,\frac{\xi T}{3}\,e^{2\phi}}} \\ \frac{h^2}{32} &= \frac{\xi^7\,e^{4\phi}}{\left(1\,\pm\,\sqrt{1\,-\,\frac{\xi T}{3}\,e^{2\phi}}\right)^7}\left[\frac{42}{\xi}\left(1\,\pm\,\sqrt{1\,-\,\frac{\xi T}{3}\,e^{2\phi}}\right)\,+\,5\,T\,e^{2\phi}\right]\,. \end{aligned} \qquad (2.7)$$

For

$T = \frac{16}{\pi^2}$

$\xi = 1$

we obtain:

(2*e^(0.989117352243/2)) / (1+sqrt(((1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))

Input interpretation:

$$\frac{2\, e^{0.989117352243/2}}{1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\, e^{2\times 0.989117352243}}}$$

Result:

$0.83941881822\ldots -$
$1.4311851867\ldots\, i$

Polar coordinates:

$r = 1.65919106525$ (radius), $\theta = -59.607521917°$ (angle)

1.65919106525….. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{-\frac{16\, e^{1.978234704486000}}{3\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{-\frac{16\, e^{1.978234704486000}}{3\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\, e^{1.978234704486000}}{3\pi^2}-z_0\right)^k z_0^{-k}}{k!}}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From

$$\frac{h^2}{32} = \frac{\xi^7 e^{4\phi}}{\left(1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}\right)^7} \left[\frac{42}{\xi}\left(1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}\right) + 5 T e^{2\phi}\right]$$

We obtain:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)$$

Result:

$50.84107889\ldots -$
$20.34506335\ldots\, i$

Polar coordinates:

$r = 54.76072411$ (radius), $\theta = -21.80979492°$ (angle)

54.76072411…..

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7=$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Bigg/$$

$$\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7=$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Bigg/$$

$$\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/$$

$$\left(\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From which:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]*1/34

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)\times\frac{1}{34}$$

Result:

1.495325850… −
0.5983842161… i

Polar coordinates:

$r = 1.610609533$ (radius), $\theta = -21.80979492°$ (angle)

1.610609533…. result that is a good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$\left(\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/$$

$$\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/$$

$$\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(17\,\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

Now, we have:

$$e^{2C} = \frac{2\,\xi\,e^{-\frac{\phi}{2}}}{1+\sqrt{1+\frac{\xi\Lambda}{3}\,e^{2\phi}}}\,, \tag{2.9}$$

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\left[42\left(1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right)-13\,\Lambda\,e^{2\phi}\right]. \tag{2.10}$$

For:

$\xi = 1$

$\Lambda \simeq \frac{4\pi^2}{25}$

$\phi = 0.989117352243$

From

$$e^{2C} = \frac{2\xi\, e^{-\frac{\phi}{2}}}{1 + \sqrt{1 + \frac{\xi\Lambda}{3}\, e^{2\phi}}},$$

we obtain:

((2*e^(-0.989117352243/2)) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))))))))

Input interpretation:

$$\frac{2\, e^{-0.989117352243/2}}{1 + \sqrt{1 + \frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right) e^{2\times 0.989117352243}}}$$

Result:

0.382082347529...

0.382082347529….

Series representations:

$$\frac{2\, e^{-0.98911735224300000/2}}{1 + \sqrt{1 + \frac{\left(4\,\pi^2\right) e^{2\times 0.98911735224300000}}{3\times 25}}} = 2 \Bigg/ \left(e^{0.4945586761215000} \left(1 + \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}}\, \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)\right)$$

$$\frac{2\, e^{-0.98911735224300000/2}}{1 + \sqrt{1 + \frac{\left(4\,\pi^2\right) e^{2\times 0.98911735224300000}}{3\times 25}}} = 2 \Bigg/ \left(e^{0.4945586761215000} \left(1 + \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}}\, \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$\frac{2\,e^{-0.9891173522430000/2}}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}} = \frac{2}{e^{0.4945586761215000}\left(1+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)}$$

$$\text{for }(\text{not }(z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

From which:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))))

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}}}$$

Result:

1.65430921270...

1.6543092….. We note that, the result 1.6543092... is very near to the 14th root of the following Ramanujan’s class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Indeed:

$$G_{505} = P^{-1/4}Q^{1/6} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4}$$
$$\times\left((130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}\right)^{1/6}.$$

Thus, it remains to show that

$$(130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}} = \left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3,$$

which is straightforward. □

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1,65578\ldots$$

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}}=1+\frac{e^{0.4945586761215000}}{8}+$$

$$\frac{1}{8}\,e^{0.4945586761215000}\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

And from

$$\frac{h^2}{32}=\frac{e^{-4\phi}}{\left[1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\left[42\left(1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right)-13\,\Lambda\,e^{2\phi}\right].$$

we obtain:

e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))-13*(4Pi^2)/25*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)$$

Result:

$-0.034547055658\ldots$

$-0.034547055658\ldots$

Series representations:

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.98911735224300000}\right)\right.\right.$$

$$\left.\left.e^{-4\times 0.98911735224300000}\right)\middle/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.\right.$$

$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$

$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\middle/\left(25\,e^{5.934704113458000}\right.$$

$$\left.\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)e^{-4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7=$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Bigg/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)e^{-4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7=$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Bigg/\left(25\,e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From which:

47 *1/(((-1/(((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))))))

Input interpretation:

$$47\left(-\left(1\middle/1\middle/\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)\right)$$

Result:

1.6237116159...

1.6237116159…. result that is an approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$-\left(47\middle/1\middle/\left(e^{-4\times 0.98911735224300000}\left(42\left(1+\sqrt{1+\frac{\left(4\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}-\frac{1}{25}\left(4\pi^2\right)13\,e^{2\times 0.98911735224300000}\right)\right)\middle/\left(1+\sqrt{1+\frac{\left(4\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}\right)^7\right)\right)=$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\middle/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)=$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)=$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not $(z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0)$)

And again:

32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))- 13*(4Pi^2)/25*e^(2*0.989117352243))]))))

Input interpretation:

$$32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)$$

Result:

−1.1055057810...

-1.1055057810….

We note that the result -1.1055057810…. is very near to the value of Cosmological Constant, less 10^{-52} , thence 1.1056, with minus sign

Series representations:

$$\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\;-\frac{1}{25}\,(4\,\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(32\, e^{-4\times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}} - \frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - 25\, e^{1.978234704486000} \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Big/ \left(25\, e^{5.934704113458000} \left(1+\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(32\, e^{-4\times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}} - \frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - 25\, e^{1.978234704486000} \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.978234704486000}\, \pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(25\, e^{5.934704113458000} \left(1+\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.978234704486000}\, \pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

And:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))))]^5

Input interpretation:

$$-\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)^5$$

Result:

1.651220569...

1.651220569…. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164.2696 i.e. 1.65578...

Series representations:

$$-\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\;-\frac{1}{25}\,(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\,e^{1.978234704486000}\,\pi^2-25\,\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\,\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^5\right)\Big/\left(9\,765\,625\,e^{19.78234704486000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\,\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^{35}\right)$$

$$-\left(\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\,\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5=$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\,e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\Big/\left(9\,765\,625\,e^{19.78234704486000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^{35}\right)$$

$$-\left(\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\,\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5=$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\,e^{1.978234704486000}\,\pi^2-25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^5\right)\Big/\left(9\,765\,625\,e^{19.78234704486000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^{35}\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

We obtain also:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))))]^1/2

Input interpretation:

$$-\sqrt{\left(32\left(\frac{e^{-4\times0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^{2}\right)\right)e^{2\times0.989117352243}}\right)^{7}}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^{2}\right)\right)e^{2\times0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^{2}\right)\right)e^{2\times0.989117352243}\right)\right)\right)\right)}$$

Result:

-0
$1.0514303501\ldots\, i$

Polar coordinates:

$r = 1.05143035007$ (radius), $\theta = -90°$ (angle)

1.05143035007

Series representations:

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{\left(4\pi^2\right) e^{2\times 0.9891173522430000}}{3\times 25}}\right.\right.\right.\right.} \quad -$$

$$\left.\left.\left.\frac{1}{25}\left(4\pi^2\right) 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/$$

$$\left.\left(1+\sqrt{1+\frac{\left(4\pi^2\right) e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) = -\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\right.\right.}$$

$$\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(e^{3.956469408972000}\right.$$

$$\left.\left.\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$-\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\,\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=-\frac{8}{5}\,\sqrt{21}\,\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\,\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\,\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=-\frac{8}{5}\,\sqrt{21}\,\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}$$

for (not $(z_0\in\mathbb{R}$ and $-\infty<z_0\leq 0)$)

1 / -[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))- 13*(4Pi^2)/25*e^(2*0.989117352243))])))]^1/2

Input interpretation:

$$-\left(1\Big/\left(\sqrt{\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^{2}\right)\right)e^{2\times 0.989117352243}}\right)^{7}}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^{2}\right)\right)e^{2\times 0.989117352243}}\right)-13\left(\frac{1}{25}\left(4\pi^{2}\right)\right)e^{2\times 0.989117352243}\right)\right)\right)}\right)\right)$$

Result:

0.95108534763... i

Polar coordinates:

$r = 0.95108534763$ (radius), $\theta = 90°$ (angle)

0.95108534763

We know that the primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index $n_s = 0.965 \pm 0.004$, consistent with the predictions of slow-roll, single-field, inflation.

Thence 0.95108534763 is a result very near to the spectral index n_s, to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{\mathrm{e}^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{\mathrm{e}^{-\pi}}{1+\cfrac{\mathrm{e}^{-2\pi}}{1+\cfrac{\mathrm{e}^{-3\pi}}{1+\cfrac{\mathrm{e}^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

Series representations:

$$-\left(1\middle/\left(\sqrt{\frac{32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)-\frac{1}{25}\,(4\,\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)}{\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7}}\right)\right)=$$

$$-\left(5\middle/\left(8\sqrt{21}\sqrt{\frac{25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}}{e^{3.956469408972000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7}}\right)\right)$$

$$
\begin{aligned}
&-\Biggl(1 \Big/ \Biggl(\sqrt{\Biggl(\Biggl(32\, e^{-4 \times 0.9891173522430000} \Biggl(42 \Biggl(1 + \sqrt{1 + \frac{(4\,\pi^2)\, e^{2 \times 0.9891173522430000}}{3 \times 25}}\Biggr) -} \\
&\qquad \frac{1}{25}\,(4\,\pi^2)\, 13\, e^{2 \times 0.9891173522430000}\Biggr)\Biggr)\Biggr) \Big/ \\
&\qquad \Biggl(1 + \sqrt{1 + \frac{(4\,\pi^2)\, e^{2 \times 0.9891173522430000}}{3 \times 25}}\Biggr)^7\Biggr)\Biggr)\Biggr) = \\
&-\Biggl(5 \Big/ \Biggl(8\,\sqrt{21}\, \sqrt{\Biggl(\Biggl(\Biggl(25 - 52\, e^{1.978234704486000}\, \pi^2 + 25\, \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}}} \\
&\qquad \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\Biggr) \Big/ \\
&\qquad \Biggl(e^{3.956469408972000} \Biggl(1 + \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \\
&\qquad \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\Biggr)^7\Biggr)\Biggr)\Biggr)\Biggr)\Biggr)
\end{aligned}
$$

$$-\left(1\Bigg/\left(\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\,\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Bigg/\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Bigg/\left(8\sqrt{21}\,\sqrt{\left(\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)\right)}\right)\right)$$

$$\text{for } (\text{not } (z_0\in\mathbb{R} \text{ and } -\infty<z_0\leq 0))$$

From the previous expression

$$\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\,(4\,\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\,(4\,\pi^2)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\,(4\,\pi^2)\right)e^{2\times 0.989117352243}\right)\right)$$

= -0.034547055658…

we have also:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))))))))) + (-0.034547055658)

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times0.989117352243}}}}-0.034547055658$$

Result:

1.61976215705...

1.61976215705….. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times0.98911735224300000}}{3\times25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\,\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times0.98911735224300000}}{3\times25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times0.98911735224300000}}{3\times25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+$$

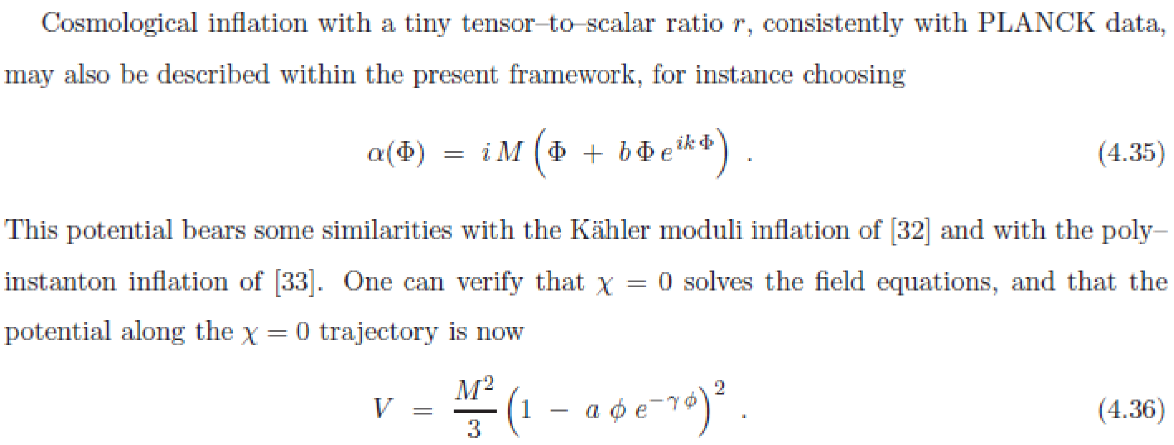
$$\frac{1}{8}\,e^{0.4945586761215000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

for (not $(z_0\in\mathbb{R}$ and $-\infty<z_0\leq0)$)

From

Properties of Nilpotent Supergravity
E. Dudas, S. Ferrara, A. Kehagias and A. Sagnotti - arXiv:1507.07842v2 [hep-th] 14 Sep 2015

We have that:



Cosmological inflation with a tiny tensor–to–scalar ratio r, consistently with PLANCK data, may also be described within the present framework, for instance choosing

$$\alpha(\Phi)\;=\;i\,M\left(\Phi\;+\;b\,\Phi\,e^{ik\,\Phi}\right)\;. \tag{4.35}$$

This potential bears some similarities with the Kähler moduli inflation of [32] and with the poly–instanton inflation of [33]. One can verify that $\chi=0$ solves the field equations, and that the potential along the $\chi=0$ trajectory is now

$$V\;=\;\frac{M^2}{3}\left(1\;-\;a\,\phi\,e^{-\gamma\,\phi}\right)^2\;. \tag{4.36}$$

We analyzing the following equation:

$$V\;=\;\frac{M^2}{3}\left(1\;-\;a\,\phi\,e^{-\gamma\,\phi}\right)^2\;.$$

$$\phi\;=\;\varphi\;-\;\frac{\sqrt{6}}{k}\;,$$

$$a = \frac{b\gamma}{e} < 0 , \qquad \gamma = \frac{k}{\sqrt{6}} < 0 .$$

We have:

(M^2)/3*[1-(b/euler number * k/sqrt6) * (φ- sqrt6/k) * exp(-(k/sqrt6)(φ- sqrt6/k))]^2

i.e.

V = (M^2)/3*[1-(b/euler number * k/sqrt6) * (φ- sqrt6/k) * exp(-(k/sqrt6)(φ- sqrt6/k))]^2

For k = 2 and φ = 0.9991104684, that is the value of the scalar field that is equal to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\dfrac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5 \sqrt[4]{5^3}}-1}}-\varphi+1} = 1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}} \approx 0.9991104684$$

we obtain:

V = (M^2)/3*[1-(b/euler number * 2/sqrt6) * (0.9991104684- sqrt6/2) * exp(-(2/sqrt6)(0.9991104684- sqrt6/2))]^2

Input interpretation:

$$V = \frac{M^2}{3}\left(1-\left(\frac{b}{e}\times\frac{2}{\sqrt{6}}\right)\left(0.9991104684-\frac{\sqrt{6}}{2}\right)\exp\left(-\frac{2}{\sqrt{6}}\left(0.9991104684-\frac{\sqrt{6}}{2}\right)\right)\right)^2$$

Result:

$$V = \frac{1}{3}\,(0.0814845\,b+1)^2\,M^2$$

Solutions:

$$b = \frac{225.913\left(-0.054323\,M^2 \pm 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2} \quad (M \neq 0)$$

Alternate forms:

$$V = 0.00221324\,(b + 12.2723)^2\,M^2$$

$$V = 0.00221324\left(b^2\,M^2 + 24.5445\,b\,M^2 + 150.609\,M^2\right)$$

$$-0.00221324\,b^2\,M^2 - 0.054323\,b\,M^2 - \frac{M^2}{3} + V = 0$$

Expanded form:

$$V = 0.00221324\,b^2\,M^2 + 0.054323\,b\,M^2 + \frac{M^2}{3}$$

Alternate form assuming b, M, and V are positive:

$$V = 0.00221324\,(b + 12.2723)^2\,M^2$$

Alternate form assuming b, M, and V are real:

$$V = 0.00221324\,b^2\,M^2 + 0.054323\,b\,M^2 + 0.333333\,M^2 + 0$$

Derivative:

$$\frac{\partial}{\partial b}\left(\frac{1}{3}\,(0.0814845\,b + 1)^2\,M^2\right) = 0.054323\,(0.0814845\,b + 1)\,M^2$$

Implicit derivatives:

$$\frac{\partial b(M, V)}{\partial V} = \frac{154317775011120075}{36961748\,(226802245 + 18480874\,b)\,M^2}$$

$$\frac{\partial b(M, V)}{\partial M} = -\frac{\frac{226802245}{18480874} + b}{M}$$

$$\frac{\partial M(b, V)}{\partial V} = \frac{154317775011120075}{2\,(226802245 + 18480874\,b)^2\,M}$$

$$\frac{\partial M(b, V)}{\partial b} = -\frac{18480874\,M}{226802245 + 18480874\,b}$$

$$\frac{\partial V(b, M)}{\partial M} = \frac{2\,(226802245 + 18480874\,b)^2\,M}{154317775011120075}$$

$$\frac{\partial V(b, M)}{\partial b} = \frac{36961748\,(226802245 + 18480874\,b)\,M^2}{154317775011120075}$$

Global minimum:

$$\min\left\{\frac{1}{3}\,(0.0814845\,b + 1)^2\,M^2\right\} = 0 \text{ at } (b, M) = (-16, 0)$$

Global minima:

$$\min\left\{\frac{1}{3} M^2 \left(1 - \frac{(b\ 2)\left(0.9991104684 - \frac{\sqrt{6}}{2}\right)\exp\left(-\frac{2\left(0.9991104684-\frac{\sqrt{6}}{2}\right)}{\sqrt{6}}\right)}{e\sqrt{6}}\right)^2\right\} = 0$$

for $b = -\frac{226\,802\,245}{18\,480\,874}$

$$\min\left\{\frac{1}{3} M^2 \left(1 - \frac{(b\ 2)\left(0.9991104684 - \frac{\sqrt{6}}{2}\right)\exp\left(-\frac{2\left(0.9991104684-\frac{\sqrt{6}}{2}\right)}{\sqrt{6}}\right)}{e\sqrt{6}}\right)^2\right\} = 0$$

for $M = 0$

From:

$$b = \frac{225.913\left(-0.054323\, M^2 \pm 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2} \quad (M \neq 0)$$

we obtain

(225.913 (-0.054323 M^2 + 6.58545×10^-10 sqrt(M^4)))/M^2

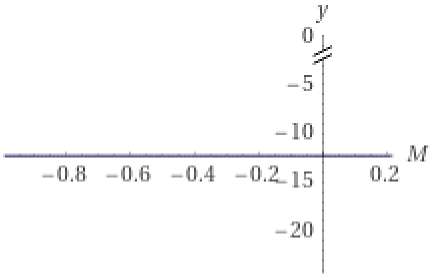
Input interpretation:

$$\frac{225.913\left(-0.054323\, M^2 + 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}$$

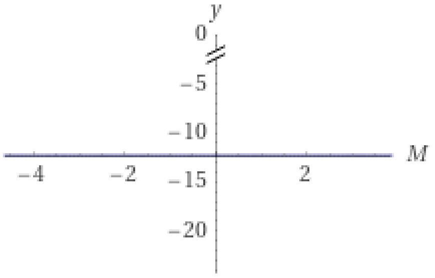
Result:

$$\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4} - 0.054323\, M^2\right)}{M^2}$$

Plots:



(M from −1 to 0.2)



(M from −4.6 to 3.9)

Alternate form assuming M is real:

-12.2723

-12.2723 result very near to the black hole entropy value 12.1904 = ln(196884)

Alternate forms:

$$-\frac{12.2723\left(M^2 - 1.21228\times 10^{-8}\sqrt{M^4}\right)}{M^2}$$

$$\frac{1.48774\times 10^{-7}\sqrt{M^4} - 12.2723\,M^2}{M^2}$$

Expanded form:

$$\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M^2} - 12.2723$$

Property as a function:

Parity

even

Series expansion at M = 0:

$$\left(\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M^2} - 12.2723\right) + O\left(M^6\right)$$

(generalized Puiseux series)

Series expansion at M = ∞:

$$-12.2723$$

Derivative:

$$\frac{d}{dM}\left(\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4} - 0.054323\,M^2\right)}{M^2}\right) = \frac{3.55271\times 10^{-15}}{M}$$

Indefinite integral:

$$\int \frac{225.913\left(-0.054323\,M^2 + 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}\,dM =$$

$$\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M} - 12.2723\,M + \text{constant}$$

Global maximum:

$$\max\left\{\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4}-0.054323\,M^2\right)}{M^2}\right\}=$$
$$-\frac{140\,119\,826\,723\,990\,341\,497\,649}{11\,417\,594\,849\,251\,000\,000\,000}\ \text{at}\ M=-1$$

Global minimum:

$$\min\left\{\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4}-0.054323\,M^2\right)}{M^2}\right\}=$$
$$-\frac{140\,119\,826\,723\,990\,341\,497\,649}{11\,417\,594\,849\,251\,000\,000\,000}\ \text{at}\ M=-1$$

Limit:

$$\lim_{M\to\pm\infty}\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}=-12.2723$$

Definite integral after subtraction of diverging parts:

$$\int_0^\infty\left(\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}--12.2723\right)dM=0$$

From b that is equal to

$$\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}$$

from:

Result:

$$V = \frac{1}{3}(0.0814845\,b + 1)^2 M^2$$

we obtain:

1/3 (0.0814845 ((225.913 (-0.054323 M^2 + 6.58545×10^-10 sqrt(M^4)))/M^2) + 1)^2 M^2

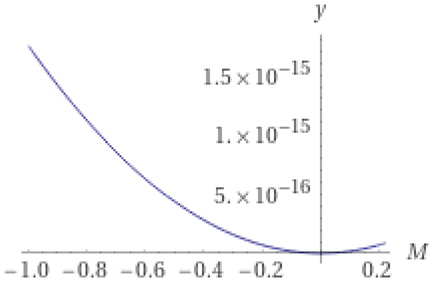
Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2 + 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2} + 1\right)^2 M^2$$

Result:

0

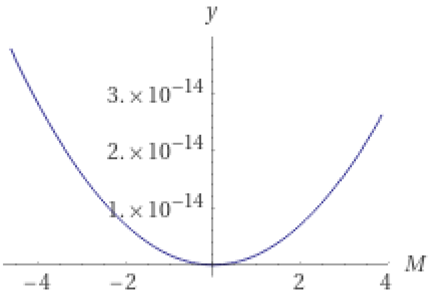
Plots: **(possible mathematical connection with an open string)**



(M from −1 to 0.2)

M = -0.5; M = 0.2

(possible mathematical connection with an open string)



(*M* from −4.6 to 3.9)

M = 2 ; M = 3

Root:

$M = 0$

Property as a function:

Parity

even

Series expansion at M = 0:

$O(M^{62194})$

(Taylor series)

Series expansion at M = ∞:

$1.75541 \times 10^{-15} M^2 + O\left(\left(\frac{1}{M}\right)^{62194}\right)$

(Taylor series)

Definite integral after subtraction of diverging parts:

$$\int_0^\infty \left(\frac{1}{3} M^2 \left(1 + \frac{18.4084 \left(-0.054323\, M^2 + 6.58545 \times 10^{-10} \sqrt{M^4} \right)}{M^2} \right)^2 - 1.75541 \times 10^{-15}\, M^2 \right) dM = 0$$

For M = - 0.5 , we obtain:

$$\frac{1}{3} \left(0.0814845 \times \frac{225.913 \left(-0.054323\, M^2 + 6.58545 \times 10^{-10} \sqrt{M^4} \right)}{M^2} + 1 \right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 (-0.5)^2 + 6.58545×10^-10 sqrt((-0.5)^4)))/(-0.5)^2) + 1)^2 * (-0.5^2)

Input interpretation:

$$\frac{1}{3} \left(0.0814845 \times \frac{225.913 \left(-0.054323 \, (-0.5)^2 + 6.58545 \times 10^{-10} \sqrt{(-0.5)^4} \right)}{(-0.5)^2} + 1 \right)^2 \left(-0.5^2 \right)$$

Result:

$$-4.38851344947464545348970783378088020833333333333333333333\ldots \times 10^{-16}$$

$-4.38851344947 \cdot 10^{-16}$

For M = 0.2:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 0.2^2 + 6.58545×10^-10 sqrt(0.2^4)))/0.2^2) + 1)^2 0.2^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times0.2^2+6.58545\times10^{-10}\sqrt{0.2^4}\right)}{0.2^2}+1\right)^2\times0.2^2$$

Result:

$7.02162151915943272558353253404940833333333333333333333333333\ldots\times 10^{-17}$

$7.021621519159*10^{-17}$

For M = 3:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 3^2 + 6.58545×10^-10 sqrt(3^4)))/3^2) + 1)^2 3^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times3^2+6.58545\times10^{-10}\sqrt{3^4}\right)}{3^2}+1\right)^2\times3^2$$

Result:

$1.579864841810872363256294820161116875\times10^{-14}$

$1.57986484181*10^{-14}$

For M = 2:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 2^2 + 6.58545×10^-10 sqrt(2^4)))/2^2) + 1)^2 2^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times2^2+6.58545\times10^{-10}\sqrt{2^4}\right)}{2^2}+1\right)^2\times2^2$$

Result:

$$7.0216215191594327255835325340494083333333333333333333333333\ldots \times 10^{-15}$$

$7.021621519*10^{-15}$

From the four results

7.021621519*10^-15 ; 1.57986484181*10^-14 ; 7.021621519159*10^-17 ;

-4.38851344947*10^-16

we obtain, after some calculations:

sqrt[1/(2Pi)(7.021621519*10^-15 + 1.57986484181*10^-14 +7.021621519*10^-17 - 4.38851344947*10^-16)]

Input interpretation:

$$\sqrt{\left(\frac{1}{2\pi}\left(7.021621519\times 10^{-15} + 1.57986484181\times 10^{-14} + 7.021621519\times 10^{-17} - 4.38851344947\times 10^{-16}\right)\right)}$$

Result:

$$5.9776991059\ldots \times 10^{-8}$$

$5.9776991059*10^{-8}$ result very near to the Planck's electric flow 5.975498×10^{-8} that is equal to the following formula:

$$\phi_{\mathrm{P}}^{E} = \mathbf{E}_{\mathrm{P}}\, l_{\mathrm{P}}^{2} = \phi_{\mathrm{P}}\, l_{\mathrm{P}} = \sqrt{\frac{\hbar c}{\varepsilon_0}}$$

We note that:

1/55*(([(((1/[(7.021621519*10^-15 + 1.57986484181*10^-14 +7.021621519*10^-17 -4.38851344947*10^-16)])))^1/7]-((log^(5/8)(2))/(2 2^(1/8) 3^(1/4) e log^(3/2)(3)))))

Input interpretation:

$$\frac{1}{55}\left((1/(7.021621519\times 10^{-15} + 1.57986484181\times 10^{-14} + 7.021621519\times 10^{-17} - 4.38851344947\times 10^{-16}))\ \hat{}\ (1/7) - \frac{\log^{5/8}(2)}{2\sqrt[8]{2}\,\sqrt[4]{3}\, e \log^{3/2}(3)}\right)$$

log(x) is the natural logarithm

Result:

1.6181818182…

1.6181818182… result that is a very good approximation to the value of the golden ratio 1.618033988749...

From the Planck units:

Planck Length

$$l_{\mathrm{P}} = \sqrt{\frac{4\pi\hbar G}{c^3}}$$

5.729475 * 10^{-35} Lorentz-Heaviside value

Planck's Electric field strength

$$\mathbf{E}_\mathrm{P} = \frac{F_\mathrm{P}}{q_\mathrm{P}} = \sqrt{\frac{c^7}{16\pi^2\varepsilon_0\hbar G^2}}$$

1.820306 * 10^{61} V*m Lorentz-Heaviside value

Planck's Electric flux

$$\phi_\mathrm{P}^E = \mathbf{E}_\mathrm{P}\, l_\mathrm{P}^2 = \phi_\mathrm{P}\, l_\mathrm{P} = \sqrt{\frac{\hbar c}{\varepsilon_0}}$$

5.975498*10^{-8} V*m Lorentz-Heaviside value

Planck's Electric potential

$$\phi_P = V_P = \frac{E_P}{q_P} = \sqrt{\frac{c^4}{4\pi\varepsilon_0 G}}$$

1.042940*10^{27} V Lorentz-Heaviside value

Relationship between Planck's Electric Flux and Planck's Electric Potential

E_P * l_P = (1.820306 * 10^{61}) * 5.729475 * 10^{-35}

Input interpretation:

$$\frac{(1.820306\times 10^{61})\times 5.729475}{10^{35}}$$

Result:

1 042 939 771 935 000 000 000 000 000

Scientific notation:

$1.042939771935\times 10^{27}$

$1.042939771935*10^{27} \approx 1.042940*10^{27}$

Or:

$\mathbf{E_P * l_P^2 / l_P} = (5.975498*10^{-8})*1/(5.729475 * 10^{-35})$

Input interpretation:

$$5.975498\times 10^{-8}\times \frac{1}{\frac{5.729475}{10^{35}}}$$

Result:

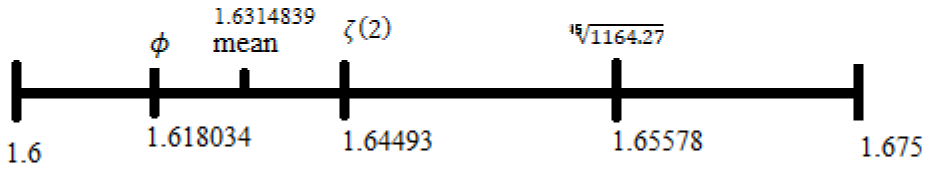
$1.042939885417075735560413475929295441554418162222542205001 33\ldots \times 10^{27}$

$1.042939885417*10^{27} \approx 1.042940*10^{27}$

Observations

We note that various results highlighted in blue belong to the following range:

“Golden” Range



Furthermore for all the results very near to 1728 or 1729, adding 64, one obtain values about equal to 1792 or 1793. These are values almost equal to the Planck multipole spectrum frequency 1792.35

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References

Alpha-prime corrections to space-like branes
Shibaji Roy and Harvendra Singh – arXiv:0707.1422v2 [hep-th] 23 Jul 2007

hep-th/9606169 - February 1, 2008
Chiral Asymmetry in Four-Dimensional Open-String Vacua - *C. Angelantonj, M. Bianchi, G. Pradisi, A. Sagnotti and Ya.S. Stanev*

Extremal Black Hole Entropy - *Ashoke Sen* - Harish-Chandra Research Institute, Allahabad, India – October 2009

Quantum Black Holes - *Atish Dabholkar*

Toroidal compactification and symmetry breaking in open-string theories - *M. Bianchi, G. Pradisi and A. Sagnotti* - Nuclear Physics B 376 (1992) *365—386* North-Holland

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

AdS Vacua from Dilaton Tadpoles and Form Fluxes - *J. Mourad and A. Sagnotti* - arXiv:1612.08566v2 [hep-th] 22 Feb 2017 - March 27, 2018

Properties of Nilpotent Supergravity
E. Dudas, S. Ferrara, A. Kehagias and A. Sagnotti - arXiv:1507.07842v2 [hep-th] 14 Sep 2015